
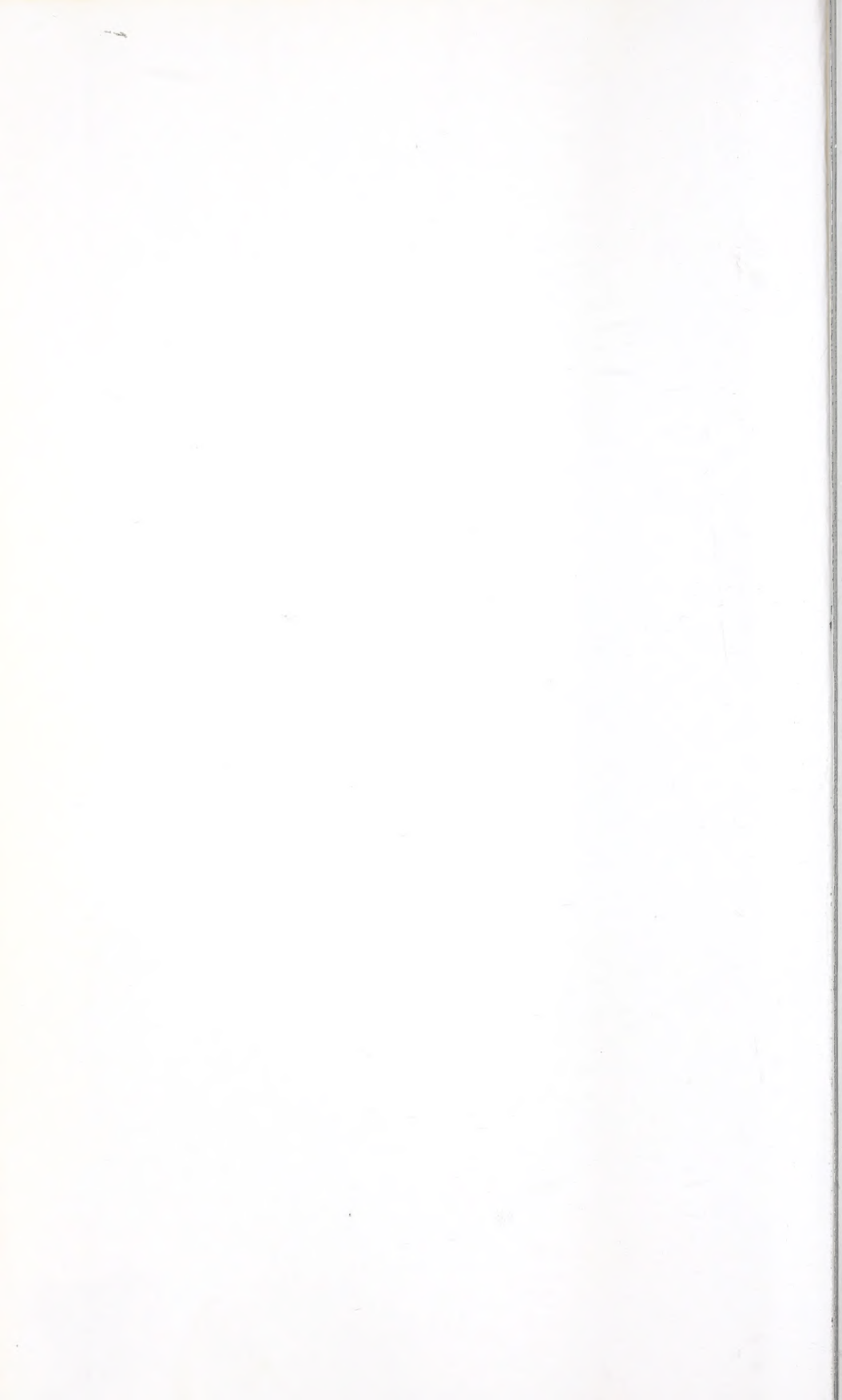


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Language, Culture, and Communication

Language, Culture, and Communication

Essays by Joseph H. Greenberg

**Selected and Introduced
by Anwar S. Dil**

Stanford University Press, Stanford, California 1971

Language Science and National Development

A Series Sponsored by the
Linguistics Research Group of Pakistan



General Editor: Anwar S. Dil

Stanford University Press
Stanford, California
© 1971 by the Board of Trustees of the
Leland Stanford Junior University
Printed in the United States of America
ISBN 0-8047-0781-2
LC 72-150323

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Acknowledgments

The Linguistic Research Group of Pakistan and the Editor of the Language Science and National Development Series are deeply grateful to Professor Joseph H. Greenberg for giving us the privilege of presenting his selected writings as the second volume in our series established in 1970 to commemorate the International Education Year.

We are indebted to the editors and publishers of the following publications. The ready permission on the part of the holders of the copyrights, acknowledged in each case, is a proof of the existing international cooperation and goodwill that gives hope for better collaboration among scholars of all nations for international exchange of knowledge.

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The Nature and Definition of Language. Anthropological Linguistics: An Introduction, by J.H. Greenberg (New York: Random House, 1968), pp. 3-17, with permission of the publisher. © 1968 by Random House, Inc.

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Is Language Like a Chess Game? American Anthropological Association Bulletin Series, Annual Report 4:1 (1971), with permission of the Association.

The Editor completed work on this volume during 1970-71, while he was in residence as Visiting Scholar at Stanford University. The financial assistance from the Center for Research in International Studies, Stanford University, to cover typing expenses of the manuscript is gratefully acknowledged. He is personally grateful to the Stanford International Development Education Center for providing him with office accommodation.

The Editor also wishes to record his thanks to Professors John J. Gumperz, Einar Haugen, Wallace E. Lambert, Joshua A. Fishman, and other language scholars who have sent us materials for our forthcoming volumes. Afia Dil and Edith Moravesik of the Committee on Linguistics, Stanford University, Nasim Dil of the Department of Special Education, Indiana University, and J.M.B. Edwards of Stanford University Press, deserve our gratitude for help in many ways. My daughter, Saeqa Dil of the Massachusetts Institute of Technology, has done most of the typing of camera-ready manuscript and she certainly deserves a word of appreciation. Special thanks are due to Emily Hallin whose helping hand made it possible for the Editor to complete the project on schedule.

EDITOR'S NOTE

These essays have been reprinted from the originals with only minor changes made in the interest of uniformity of style and appearance. A few changes in wording have been made in consultation with the author. In some cases bibliographical entries and notes have been updated. Footnotes marked by asterisks have been added by the Editor.

Introduction

Joseph Harold Greenberg was born in 1915 in Brooklyn, New York. He showed early interest in language studies and started learning Hebrew, Latin and German at school and Greek and a few other languages on his own. As an undergraduate at Columbia College, he attended the linguistic seminars of Franz Boas. His parents expected him to develop his musical talent and perhaps become a pianist, but young Greenberg had made his own plans: he wanted to devote his life to medieval history, a field in which he thought his natural interest in languages could be turned to best advantage.

As so often, the outcome was decided by chance. A conversation between Greenberg and his anthropology teacher, Alexander Lesser, led to his being recommended by Franz Boas and Ruth Benedict for a SSRC predoctoral fellowship in Anthropology. He went to Northwestern University, where he came in close contact with Melville J. Herskovits, the great pioneer of African studies. Northwestern, however, did not have the facilities for linguistic education that Greenberg needed. He therefore spent a year at Yale University studying with Leonard Bloomfield, Edward Sapir, Bernard Bloch and other linguists and linguistic anthropologists. After a year's field work in West Africa, he returned and received a Ph.D. in anthropology from Northwestern. He then returned to Yale for a few months to continue his linguistic studies.

Greenberg's long list of publications, begun in 1940 with an article for the Journal of Negro History, was interrupted by his army service during World War II. In 1946, he was able to publish his monograph, The Influence of Islam on a Sudanese Religion. The same year he started teaching at the University of Minnesota. In 1948 he moved to Columbia University, where he worked for fourteen years. He joined Stanford University in 1962. Here, in addition

to his duties as Professor of Anthropology, he has been Chairman of the Committee on African Studies and Director of the NDEA African Language and Area Program.

Greenberg has also taught as a Visiting Professor at a number of universities. The publications he has served as editor or advisor include Word, American Anthropologist, Journal of African Studies, and the International Encyclopedia of Social Sciences. He has been a member of the Committee on Linguistics and Psychology of the Social Science Research Council and representative of the American Anthropological Association on the Governing Board of the International African Institute. In 1965 he was elected a member of the National Academy of Sciences.

One of Greenberg's most fruitful ventures, from the point of view of language science and national development, has been his leadership in the Language Survey of West Africa. This survey has resulted in a number of linguistic monographs as well as in the founding of the Linguistic Society of West Africa, of which Greenberg was the first president, and in the establishment of the West African Language Monograph Series. It has also helped in the creation and development of facilities for linguistic training and research in a number of African countries.

In the late forties and early fifties, Greenberg attracted international attention with his series of articles on African languages and their classification published in the Southwestern Journal of Anthropology. The revised versions of these articles appeared in book form in 1955, and the third, substantially revised version, came out in 1963 as The Languages of Africa. Greenberg's classification system aroused a great deal of controversy, but the basic soundness of his underlying principles and methodology has become widely accepted. Guided by the belief that language provides one of the fundamental bases for the reconstruction of human history, Greenberg's genetic classification of African languages provides penetrating insights into the sociocultural identity of the African people. The Emperor of Ethiopia, while awarding him the 1967 Haile Selassie Award for African Research paid him a well-earned tribute: "In a continent where the written record is so scant, the work of Professor Greenberg, which scientifically reconstructs an

important aspect of the African past, is of the highest importance for our greater knowledge of this continent."

Greenberg's reputation as one of the most imaginative linguists of our time was established with the publication of his Essays in Linguistics (1957). His bold methodological explorations and his outstanding ability to reduce a great mass of facts to precise generalizations is seen in this small but important book which for some reason has not been so widely read as it deserves. Its importance was recognized by, among others, Noam Chomsky who confessed in his review that it is much easier to find defects in the methods developed by Greenberg than to improve upon them.

Greenberg spent the academic year 1958-59 at the Center for Advanced Study in the Behavioral Sciences at Stanford, where he carried out the exploratory studies that led to the Dobbs Ferry Conference on Language Universals in 1961. He edited the papers presented on that occasion in Universals of Language (1963) and has continued to do research in this field, as can be seen, for instance, in Language Universals with Special Reference to Feature Hierarchies (1966). The Stanford Project on Language Universals, with Professor Charles A. Ferguson as Co-Director, has been collecting information on basic aspects of the phonology, grammar and semantics of natural languages, with a view to establishing types and arriving at generalizations.

Most recently Greenberg has been pursuing his interest in language classification by improving his earlier work on the American Indian languages of South and Central America and by extending his massive explorations to the Pacific and other regions. The practical aspects of Greenberg's studies have not yet been investigated. But it is not difficult to see, in several of the essays in this selection, his deep concern with the higher-level processes of human thought that bind the peoples of the world together.

Greenberg's universal human frame of reference and the spirit of adventure that he brings to language problems owe a good deal to his formal education in anthropology. His contribution to the science was recognized at the 1970 annual meeting of the American

Anthropological Association when he was honored as the first Distinguished Lecturer in the history of the Association. This was called "the highest intellectual honor the Association can bestow on one of its Fellows." Greenberg's pioneering work in exploring the borderline areas between linguistics and anthropology, biology, psychology, mathematics and the history and philosophy of science is widely recognized. In March, 1971, he was named as Ray Lyman Wilbur Professor of Social Science in Anthropology at Stanford University.

While Greenberg is well known for his classification of African languages and his pioneering work in language universals, his contributions to sociolinguistics have been somewhat neglected. This has to do with the high visibility of his other projects and also with the rather undefined domain of this emerging field. Such essays as "The Measurement of Linguistic Diversity" (1956) and "Urbanism, Migration and Language" (1965) are on the required reading list for practically every course in the field. Nevertheless, when the idea of this volume was suggested by me he said in his characteristic humility: "I have written some things on the subject, but you couldn't make a book of them." It is indeed a privilege to write these few words of introduction to a volume that represents more than two decades of concern with the problems of language, culture and communication by a language scientist whose keen sense of problem and power of observation and analysis make his work of value both for the expert and the educated citizen.

Anwar S. Dil

Stanford International
Development Education Center,
Stanford University,
April, 1971

Language, Culture, and Communication



For purposes of the present discussion¹ we define speech as the totality of speaking activities within human social groups. We thus exclude at once the artificial symbolic languages of logic, mathematics and the sciences, and secondary languages derived from spoken languages, such as writing and code-signalling. The linguist's subject so defined recommends itself as a point of departure for a consideration of the many-faceted relations between ethnology, as the science of culture, and linguistics as the study of natural language.

The special position of linguistics arises from its two-fold nature: as a part of the science of culture by virtue of its inclusion in the mass of socially transmitted tradition of human groups, and as a part of the nascent subject of semiotics, the science of sign behavior in general. That language should be included in both of these more general sciences is no more contradictory than, for example, the double status of physical anthropology with its simultaneous affiliation with a physiologically oriented zoology and with anthropology, the general study of man approached both physically and culturally. Since linguistics faces in these two directions, it should be aware of the implications for itself both of the semiotician's discussions of language and of the general science of culture. Linguists have, on the whole, been more aware of their affiliations with cultural anthropology than with semiotics, a state of affairs which is understandable in view of the recency of the semiotician's interest in the general features of language.

In view of the analytic interests of the semioticians, who have usually approached language with a background of logical training, it is natural to turn to them for an analysis of language on

which to base our consideration of the relationships of linguistics to the rest of ethnology. At present a prime desideratum is the translation of the special terminology developed by the linguist into a general integrated language concerned with sign behavior. This task, moreover, is an essential step in the development of a unified language for the sciences.

The aspect of semiotics which I shall apply here is the analysis of language into the three dimensions of the pragmatic, the semantic, and the syntactic, first advanced by Morris,² and now widely adopted. The basis of Morris' distinctions lies in a consideration of the sign situation as involving three factors: the user of the sign, the sign itself, and the designatum or that to which the sign refers. It is not necessary to include the speakers and the designata; we may abstract from one or both of them. This gives us three fields of investigation. If we include reference to the users of the language we are in the field of pragmatics. If we abstract from the user of language and consider only expressions and their designata, we have an investigation in semantics. If we abstract also from the designata and study only the relations between the expressions themselves, we have syntax. This use of the term syntax is qualified, when necessary, as logical syntax to distinguish it from syntax as used by linguists for the study of constructions involving words. All these three aspects of languages, according to the semiotician, are the concern of one who would scientifically analyze a given language. It is the syntactic aspect, which we may equate with the linguist's term structural, which has claimed the chief interest of linguistics, and this for essentially the same reasons which have led logicians to carry to greatest extent the analysis of the syntactic dimension of logical and mathematical language, namely their susceptibility to formulation in highly condensed and symbolic form. This is a marked tendency in contemporary descriptive linguistics. It has led to statements in some branches of analysis isomorphic with those which would arise from a recourse to the symbolism of modern mathematical logic; it is merely that a different traditional notation is employed. Present-day descriptive linguists strive towards formulations in which elements are defined by a purely formal procedure without reference to meaning. While it is in syntactics that recent linguistics has made its most significant methodologic progress, the remoteness of this aspect of

language has led to the recurrent complaints of the cultural scientist against the irrelevance to their problem of a large portion of contemporary linguistics.

The semantic aspects of a language are most conveniently stated in a lexicon in which each morpheme and construction is assigned a meaning. The production of such a lexicon is traditionally a part of the descriptive linguist's treatment of a language. Differences in meaning must be referred to as criteria at various stages of his analyses, notably at the phonemic level. Moreover, general statements about phonemic and morphological patterning are approximations whose degree of probability increases as the lexicon approaches completeness. For these reasons even a formal approach to language cannot disregard semantics. Since the designata of morphemes are objects in the cultural universe of the speakers, the linguist can only state meanings by referring to extralinguistic aspects of culture. As long as the cultural background of the language is not too diverse from that of the linguist himself, or not too unfamiliar to him, this creates no special difficulty, but when faced with basic cultural differences the linguist must either call in the ethnographer or acquire the relevant ethnographical information himself. Careful compilation of a lexicon is then a field in which the linguist and ethnologist can fruitfully collaborate. To the ethnologist, the semantics of the language of the people in whom he is interested is a subject of considerable interest since it presents him with a practically exhaustive classification of the objects in the cultural universe of the speakers. For certain morphemes whose designata are not sensually perceivable events in the space-time of the investigator the linguistic approach is crucial. That this has been realized in general by ethnologists is evidenced by the liberal use of native terms which characterize magical and other ideologica! components of culture, a practice which has resulted in the borrowing via the ethnographic literature of such words as mana and taboo into the European languages.

The lexicon of a language holds as it were a mirror to the rest of culture, and the accuracy of this mirror image sets a series of problems in principle capable of empirical solution. In certain instances, notably that of kinship terminology, this problem

is a familiar one, and has occasioned a number of specific investigations. On the whole, however, the ethnographic problems presented by this aspect of language remain for the future.

With the pragmatic aspect of language we arrive at the point where the interest of the ethnologist is greatest and that of the linguist merely marginal. In general, the linguist is not interested in what the speakers of a language say on specific occasions. His own material is gathered, as such material must, from pragmatic observations of the language behavior of specific informants, but though these pragmatic aspects are primary in his actual research, formulation of results is made without reference to the speaker. The linguist has always been interested in la langue, not la parole, and this classic distinction in linguistics corresponds to the division of language into syntactics and semantics on the one hand, and pragmatics on the other.

To the ethnologist in the field, however, verbal behavior is as much an object of study, or should be, as non-verbal behavior. Like non-verbal behavior it is subject to varying degrees of patterning. The more obvious instances of highly stereotyped verbal behavior are frequently noted in ethnographies, for example formalized greetings and farewells. However, the description of the total gamut of such behavior is never attempted in ethnographic descriptions.

The slightest degree of patterning is shown on those occasions when all that may be confidently stated is whether speech will occur or not. For instance we may observe whether it is part of the standardized behavior of a people to speak at meals or keep silent. Usually the pattern is more definite in that there are limitations on the appropriate subject matter that may be mentioned in particular cultural contexts. On occasion we may go further and predict certain stylistic features, as when we state that a Sunday sermon will follow a certain organization beginning with a scriptural text and will employ a certain definable style. The highest degree of patterning is found in ritual where even the specific utterances may be predicted. Another example is found in standardized greetings which we are, revealingly enough, likely to call ritual.

The specific statements of members of a culture intended to be general statements about their own patterns of behavior are also a subject of great interest to the ethnologist. These can be verified by reference to actual behavior and any discrepancies which may appear are of considerable interest. The difference between ideal patterns and real patterns of behavior is precisely that between verbalized patterns and actual behavior. The behavior referred to may itself be verbal, as when an informant states that people greet each other in the morning by asking, "Have you slept well?", a statement capable of empirical verification.

If anything, ethnologists, a large portion of whose work consists of conversations with informants, have in the past over-emphasized such verbal formulations and the demand has increasingly been made that such statements be checked by actual observation. Here, as in the case of the meaning-area in semantics, such inconsistencies may involve a cultural lag, invariably on the side of the linguistic component, it would appear. Such observations enable us at once to reconstruct the past and note the direction of culture change.

One instance of verbalized patterns is of particular interest in connection with the topic under discussion—statements by members of the community concerning language itself. In a culture with a developed linguistic science this will be linguistics as cultural activity as well as popular statements concerning language. Here the degree of knowledge of linguistics required of the ethnological observer may be compared to the knowledge of medicine needed to evaluate native ideas concerning curing practices.

As we pass from the pragmatic through the semantic to the syntactic dimension, we reach regions which are successively less obvious to the observer and more needful of special techniques of analysis. It is for this reason that the pragmatic aspect falls to the ethnologist whose work involves gross observations of cultural activities, that the semantic aspect is a middle ground in which both ethnologist and linguist may work, while the syntactic phase, which is the most recondite, is the natural focus of interest for the linguist. Interrelationships of language with other aspects of

culture follow the same hierarchical progression. Syntactics apparently reflects nothing of the rest of culture and is inherently self-contained. Hence the linguists' contention that there is no such thing as a "primitive" language and that similar linguistic structures may appear under the most diverse cultural circumstances. In semantics, we find a direct reflection of the contents of culture, while in the field of pragmatics we deal directly with cultural behavior.

Thus far we have followed the semioticians in their formulation. This formulation, resting as it does mainly on a consideration of the symbolic languages evolved in logic and mathematics, abstracts from two most important aspects of natural languages. In treating artificial languages we are usually not interested in the history of the language or in the definition of the exact community which employs the language and the denotative relationships of the membership of that community with those of other communities using languages of less or greater degree of similarity.

The unit of the descriptive linguist is a speech community, taken more or less widely, as indicated by such rough terms as language, dialect, or sub-dialect. The definition of this community is often undertaken in the introductory portion of the linguistic description where the people are named, and population figures and geographical distributions are given. In his choice of a unit of description the linguist resembles the cultural anthropologist who describes cultural norms valid for a circumscribed group of people, a tribe, community, or nation. Such a treatment disregards—and justifiably so for the purpose in hand—relations in two directions, one towards the individual, and the other in the direction of the exact determination of the membership in this community and the relationship of its membership to others whose speech shows some degree of similarity to its own. This super-organic approach to linguistics I call cultural, as opposed to individual and social. Thus far all our discussion has been of cultural linguistics in the syntactic, semantic, and pragmatic phases.

In the field of individual speech we consider the relation of the speech habits of the individual to the rest of his personality,

a problem primarily for the social psychologist, since it can only be meaningfully investigated by reference to the speech patterns of the community of which he is a member. Here, for example, within the semantic dimension, belongs the problem of individual variant connotations of morphemes.

Social linguistics, often called ethnolinguistics, involves in its synchronic aspect, a whole series of significant problems regarding correlations between population groupings as determined by linguistic criteria and those based on biologic, economic, political, geographical, and other non-linguistic factors. For example, in such a speech community as the Japanese, where specific verb and noun forms are found whose usage depends on the status of the individuals involved in verbal communication, we may compare groupings based on these usages with socio-economic strata defined by other criteria. As an example of correlation with biological groupings, we have studies of sex differences in speech. If we consider the relationship of speech communities to each other on a geographical basis we have the field of dialect area studies and here again it is possible to note correlations with non-linguistic factors. The study of isoglosses in relation to political, economic, or religious factors is an example of this type of investigation.

Up to now we have omitted the dimension of time. If a study describes the situation at one time level, abstracting from change, I shall call it, in accordance with the usual terminology, synchronic; if it takes into consideration change through a period of time I call it diachronic. The total field of language, as here defined, is composed of eighteen combinations, involving the syntactic, semantic, and pragmatic aspects, treated from the cultural, individual, or social point of view, either synchronically or diachronically.

If we consider the development of individual speech diachronically, we are again concerned with problems primarily of interest to the social psychologist, for we investigate the individual's acquisition of speech against a social background. Such problems as the factors influencing the particular form of speech that develops in an individual and the relative influences of family and other

groupings in the determinations of the speech habits of the individual are within the scope of diachronic individual linguistics.

Cultural diachronic linguistics, particularly in its syntactic phase, is the field of historic linguistics, one of the chief activities of the professional linguist. The semantic subdivision is closely connected with the application of the historic and comparative methods insofar as it is only by resemblances both in form and meaning that the identity of specific linguistic forms can be recognized diachronically or that evidence for the relationship of diverse languages can be gathered. Some have attempted to cultivate the specific semantic aspect, notably Bréal who, in his pioneer attempt, applied the term sémantique to the historical study of meanings. The pragmatic dimension of cultural diachronic linguistics includes the historical approach to ritual and mythology, and thus includes comparative folklore. The study of specific literary forms within certain cultural traditions and the historical investigations of metrics are other examples of pragmatic historical research.

Social diachronic studies or historical ethnolinguistics is the phase of the interrelationships of ethnology and linguistics of which there has probably been the greatest awareness. The correlations between linguistic groupings of people and those derived on other bases, notably physical and cultural, is a standard problem in historic research. Examples of historical ethnolinguistic approaches are the tracing of former population distributions through linguistic groupings, the estimate of chronologic remoteness or recency of the cultural identity of groups on the basis of degree of linguistic divergence, the reconstruction of a partial cultural inventory of a proto-speech community on the basis of a reconstructed vocabulary, acculturational studies of the influence of one culture on another by the study of loan-words, and diffusionist studies of single elements of culture in which points of primary or secondary diffusion can be traced by a consideration of the form of the words which often point unequivocally to a particular language as the source.

It is perhaps worthwhile to note the extent to which our analysis of language is also applicable to culture traits in general. Obviously the distinction between synchronic and diachronic is

relevant and it is possible to study cultures either descriptively or historically. The distinction between the cultural, the social, and the individual approaches is also valid. If we adopt Linton's convenient concept of status, then the behavior patterns themselves are the results of cultural analysis, while the manner of selection of individuals for given statuses, whether achieved or ascribed, together with factors of sex, age, geographical locations, etc., are social as here defined. The study of personality variations in the carrying out of the patterns is part of the individual approach.

On the other hand, the analysis into syntactic, semantic, and pragmatic is distinctly linguistic, but in a wider range than natural language. Sometimes we find what may be called quasi-languages. For instance, in describing the game of chess, the rules of the game are syntactic while the behavior of the players is part of the pragmatic aspect. Inasmuch as the individual moves of the game seem to have no reference to anything outside themselves, the semantic dimension is lacking, hence the term quasi-language. In art and religion, we may have symbolism in which individual elements have designata or reference to things outside themselves. In these instances pragmatic, semantic, and syntactic elements are all present, and we are wont, as a matter of fact, to call such fields of expression languages. To describe on what occasions, by what performers and with what details of interpretations and audience reaction the opera "Die Walküre" was performed is a pragmatic investigation. To refer a series of low descending notes to the majesty of Wotan is a statement in semantics, while to discuss the musical form of the opera is to treat its syntactics.

The foregoing analysis reveals the richness of language and the diversity of viewpoints from which it can be approached. It suggests that linguistic and extra-linguistic segments of culture are intimately connected in a number of different ways. The ethnologist may view language merely as a tool, howbeit a vital one in his research, if he fastens his attention merely on the content of informants' statements, but he may go further and view each specimen of the informants' speech as an instance of verbal behavior revealing both personal and cultural aspects. He may, if he attains sufficient practical command of the language, observe language on its pragmatic

side in the daily life of the people. He may also penetrate into the workshop of the linguist and come to understand the technical processes employed there and utilize the finished product which he produces. Altogether there is a rewarding field which awaits the linguistically oriented ethnologist and a mature science of culture is unlikely to emerge without the linguistic approach to culture having played a significant role.

NOTES

¹This paper was read at the meeting of Section H—American Association for the Advancement of Science, Chicago, 1947. Of previous treatments of this general topic, I have profited most from the two illuminating joint articles of C. F. Voegelin and Z. S. Harris, Linguistics in Ethnology (Southwestern Journal of Anthropology, vol. 1, pp. 455-465, 1945) and The Scope of Linguistics (American Anthropologist, vol. 49, pp. 588-600, 1947).

²This distinction was first broached by Morris, in his Foundations of the Theory of Signs (Chicago, 1938). I am aware that Morris himself, in his recent book, Signs, Language and Behavior (New York, 1946), tends to deprecate the significance of this set of distinctions. However, its validity remains unimpaired and its usefulness for the problem treated here will be made apparent. In my formulation of the definitions of syntactic, semantic, and pragmatic I have closely followed R. Carnap, Introduction to Semantics (Cambridge, 1942), p. 7.

1. Historical Linguistics and Descriptive Linguistics

Unlike some other aspects of anthropology affected by the functionalist attack on history, the validity and fruitfulness of the historic approach in linguistics has never been seriously questioned. The objections which have been raised to certain assumptions of classical Indo-European comparative linguistics, such as the existence of sound laws without exceptions or the overliteral interpretation of the family-tree metaphor of language relationship, have not involved any fundamental doubt as to the legitimacy and value of historical reconstruction as such; at the most, they have, in the case of the Italian group of neo-linguists,¹ suggested specific alternative reconstructions of certain Proto-Indo-European forms.

The possibility of the application of traditional Indo-European methods to "primitive" (i.e., unwritten) languages has been deprecated by some Indo-Europeanists (Vendryes, 1925). It is evident that, while in principle the same procedures are appropriate, the absence of direct documentation for earlier historic periods is a distinct methodological handicap. The last decades, however, have seen the successful employment of classical reconstruction methods in a number of areas, including Central Algonkian by L. Bloomfield, Bantu by C. Meinhof, and Malayo-Polynesian by O. Dempwolff. It should be borne in mind that in all these cases we have rather closely related forms of speech, so that the task involved is more comparable to the reconstruction of Proto-Germanic or Proto-Slavic than that of Proto-Indo-European. These attempts do furnish an important demonstration of the universal scope of those mechanisms of linguistic change which were already known to

function in the more restricted area of the traditionally studied Indo-European, Finno-Ugric, and Semitic stocks (Hockett, 1948).

Much more serious than skepticism regarding the possibility of linguistic reconstruction in the absence of early written records is the widely held opinion, which will be discussed in a later section of this paper, that remote relationships or even those of the order existing within the Indo-European family cannot be established for primitive languages because of the far-reaching influence which one language can exercise on another even in fundamental traits of grammatical structure. It is even claimed that the genetic question here loses its meaning, in that one language can go back to several distinct origins and cannot therefore be said to belong to one family more than to another (Boas, 1920). It is worth observing that even in these cases the value of historic investigation is not denied as providing evidence of specific contacts, even though, it is held, the genetic question cannot be resolved. Thus Uhlenbeck, who, in his later writing, takes the view of genetic connections just mentioned, has lavished much time and effort on an attempt to show resemblances between the Uralic languages and Eskimo which require a historical explanation, while avoiding commitment as to the nature of the historic relationship involved.

While historic linguistics thus continues as a legitimate and major area of linguistic endeavor, it is undeniable that, with the rise of structural schools in European and American linguistics, the center of interest has shifted in the recent period from the historical problems which dominated linguistic science in the nineteenth century to those of synchronic description. The present preoccupation with descriptive formulations, which appears to be the linguistic analogue of the rise of functionalism, can contribute much that is valuable to diachronic studies. Most obviously, perhaps, any advance in descriptive techniques, by improving the quality of the data which constitute the basis of historical investigation, can furnish material for hypotheses of wider historical connections and likewise increase the precision of reconstruction for those already established. Another factor of great significance is the influence of the fundamental approach to language which all structur-

alists share, whatever their other divergences, namely, the concept of languages as a system of functional units. In its diachronic aspect this provides us with a view of change as related to a system and at least partially explainable in terms of its internal functioning through time. In the realm of sound patterns, some of these implications have been realized for some time. Thus Trubetskoy, as well as others, has distinguished between those sound changes which affect the sound structure of the language and those which leave it unchanged (Jakobson, 1931). This clearly parallels the synchronic distinction between phonetic and phonemic sound differences. Under the influence of this manner of thinking, sound change in language is more and more considered in terms of the shifts and realignment it produces in the sound structure of language rather than as a haphazard set of isolated changes, as in the traditional handbooks of historical linguistics.² The more rigorous formulation of alternations in the phonemic shape of morphemes (morphophonemics) has also borne fruit in Hoenigswald's exposition of the bearing of such data on internal reconstruction, that is, the reconstruction of certain aspects of the former states of a given language without resort to either related languages or historical records (Hoenigswald, 1950). Although historical linguists had in effect used this method without formulation, the emphasis on rigorous formulation of assumptions is, on the whole, beneficial in an area, such as historical reconstruction, in which it has so largely been lacking.

Although there is thus no fundamental opposition between the historical and descriptive approaches to language, the focusing of attention on synchronic problems in the recent historic period, combined with the traditional concentration of linguistic forces in the areas of a few major Eurasiatic speech families, has led to comparative neglect of the basic problems of historical research in unwritten languages.

II. The Establishment of Linguistic Relationship

The fundamental achievement of nineteenth-century science in linguistics, as in certain other areas, notably biology, was to

replace the traditional static interpretation of similarities in terms of fortuitous coincidence among species as kinds, all of which were created at the same time and could vary only within fixed and narrow limits, with a dynamic historic interpretation of similarities as reflecting specific historical interrelationships of varying degrees of remoteness. Taxonomy, the science of classification, thus was no longer the attempt to find essential features connecting certain things more closely than others as part of a divine plan but rather based itself on the selection of those criteria which reflected actual historic relationships. In the language of biology, it was the search for homologies rather than mere analogies. In spite of the fruitfulness of the Indo-European hypothesis and the further successes of similar hypotheses in establishing the Finno-Ugric, Semitic, and other families, the assumptions on the bases of which these first victories of linguistics as a science were obtained were never clearly formulated, and the extension of these methods to other areas of the world has suffered from the beginning from a lack of clarity regarding the criteria of genetic relationship, resulting, in almost every major area, in a welter of conflicting classifications and even in widespread doubt as to the feasibility of any interpretation of linguistic similarities in terms of historical connections. Yet assumptions which have been the very foundation on which the edifice of modern linguistics has been reared and which have helped give it a rigorousness of method and precision of result which are admittedly superior to those dealing with any other phase of human cultural behavior should not be lightly abandoned unless, of course, the data actually demand it. In what follows, an attempt is made to formulate the principles in accordance with which similarities in language can be given a historical interpretation. It is hoped that this will furnish the guiding principles on the basis of which problems in the subsequent sections referring to specific areas can receive a reasonable solution.

The fundamental assumption concerning language on the basis of which historical interpretation of linguistic similarities becomes possible seems to have been first explicitly formulated by the great Swiss linguist, Ferdinand de Saussure, in his Cours de linguistique générale, although its relevance for historical

problems is not there stated. According to de Saussure, language is a system of signs having two aspects, the signifiant and the signifié, equivalent, in the terminology of Bloomfield and of American linguists, to "form" and "meaning," respectively. Moreover, the relationship between these two aspects of the linguistic sign is essentially arbitrary. Given any particular meaning, there is no inherent necessity for any particular set of sounds to designate it in preference to any other. Although first stated in this manner by de Saussure, this assumption actually underlies the nineteenth-century hypotheses of linguistic relationships and represents essentially the solution accepted by all modern linguists of the controversy descending from the Greeks concerning the naturalness versus the conventionality of language. Given the arbitrariness of the relationship between form and meaning, resemblances between two languages significantly greater than chance must receive a historical explanation, whether of common origin or of borrowing.

This statement regarding the arbitrariness of the sign does need some qualification, in that there is a slight tendency for certain sounds or sound combinations to be connected more frequently with certain meanings than might be expected on a purely chance basis. Conspicuous instances are the nursery words for "mother" and "father" and onomatopoeias for certain species of animals. This is generally recognized as only a slight derogation from the principle of the arbitrariness of the sign, since the sound can never be predicted from the meaning; and, since such instances are relatively a minor factor from the point of view of frequency of occurrence, they will add slightly to the percentage of resemblances to be expected beyond those merely the result of chance between any two unrelated languages; but they are not adequate for the explanation of wholesale resemblances between two particular languages, such as French or Italian. Moreover, the few resemblances which rest on this factor can be allowed for by assigning them less weight in judging instances of possible historical connections between languages. This factor making for specific resemblances between languages will hereafter be called, somewhat inappropriately, "symbolism," in accordance with the terminology employed by psychologists.

Given any specific resemblance both in form and in meaning between two languages, there are four possible classes of explanations. Of these four, two—chance and symbolism—do not involve historic relationship, in contrast to the remaining pair—genetic relationship and borrowing. These four sources of similarity have parallels in nonlinguistic aspects of culture. Genetic relationship corresponds to internal evolution, borrowing to diffusion, chance to convergence through limited possibilities (as in art designs), and symbolism to convergence through similarity of function.

Up to this point resemblances in form between two languages unaccompanied by similarity of meaning and those of meaning not bound to similarity of form have not been considered. I believe that such resemblances must be resolutely excluded as irrelevant for the determination of genetic relationship. They practically always arise through convergence or borrowing. Form without function (e.g., the mere presence of tonal systems or vowel harmony in two languages) or function without form (e.g., the presence of gender morphemes in two languages expressed by different formal means) is often employed as relevant for the determination of relationship, sometimes as the sole criterion, as in Meinhof's definition of Hamitic, or in conjunction with other criteria. The preference for agreements involving meaning without accompanying sound resemblances is sometimes based on metaphysical preconceptions regarding the superiority of form over matter (Kroeber, 1913).

Resemblance in meaning only is frequently the result of convergence through limited possibilities. Important and universal aspects of human experience, such as the category of number or a system of classification based on sex or animation in the noun or one of tense or aspect in the verb, tend to appear independently in the most remote areas of the world and can never be employed as evidence for a historical connection. That the dual number occurs in Yana (California), ancient Greek, and Polynesian is obviously an instance of convergent development. Sometimes semantic similarity without similarity in the formal means of expression is present in contiguous languages of similar or diverse genetic connection. In these cases we have the linguistic analogue of Kroeber's concept of

"stimulus diffusion"—indeed, a remarkably clear-cut instance of this process. Languages spoken by people in constant culture contact forming a culture area tend to share many such semantic traits through the mechanism of diffusion. This process may be carried to the point where it is possible to translate almost literally from one language to another. However, since it is precisely the semantic aspect of language which tends to reflect changes in the cultural situation and since such semantic resemblances cover continuous geographical areas, these resemblances are clearly secondary, however far-reaching they may be in extent. Beyond the inherent probabilities, there is much empirical evidence in areas from which documented history exists. Those traits which various Balkan languages share in common and which are one of the marks of the Balkans as a cultural area are largely semantic, involving difference in the phonemic content employed as the mode of expression. Thus Rumanian, Serbian, and Greek express the future by "to wish" followed by an infinitive, but in Rumanian we have (1st person sing.) voiu + V, in Serbian ću + V, and in Greek tha + V. These are all known to be historically relatively recent and not a result of the more remote Indo-European genetic connections which all of them share. Roughly similar arguments hold for resemblances of form without meaning. There are limited possibilities for phonemic systems. For example, such historically unconnected languages as Hausa in West Africa, classical Latin, and the Penutian Yokuts share a five-vowel system with two significant degrees of length (a, a^ˆ, e, e^ˆ, i, i^ˆ, o, o^ˆ, u, u^ˆ). Some resemblances in form without function are the result of the influence of one language on another, e.g., the clicks of Zulu which have been borrowed from the Khoisan languages. Normally, when related languages have been separated for a fairly long period, we expect, and find, considerable differences both in their sound systems and in their semantic aspects resulting from differential drift and the diversity of the cultural circumstances under which their speakers have lived. Too great similarities in such matters are suspect.

Since, as has been seen, resemblances in form without meaning and meaning without form are normally explainable by hypotheses other than genetic relationship, their presence does not

indicate, nor their absence refute, it. Hence they may be left out of consideration as irrelevant for this particular problem.

The evidence relevant to the determination of genetic relationship then becomes the extent and nature of meaning-form resemblances in meaningful elements, normally the minimal element, the morpheme. Lexical resemblance between languages then refers to resemblances in root morphemes, and grammatical resemblances refer to derivational and inflectional morphemes. The two basic methodological problems become the exclusion of convergence and symbolism, on the basis of significantly more than chance resemblance leading to a hypothesis of some kind of historical connection, and among these the segregation of those cases in which borrowing is an adequate explanation of the more-than-chance resemblances from those instances in which this is inadequate and genetic relationship must be posited.

The first approach to the problem of more than chance resemblances is quantitative. We may ask how many resemblances may be expected between any two languages which are not genetically related and have not borrowed from each other or from a mutual source. Several approaches seem possible. One would involve the calculation for each of the two languages of the expected number of chance resemblances on the basis of its phonemic structure and allowed phonemic sequences arranged in terms of what may be called "resemblance classes," based on a resolution as to what phonemes are to be considered similar to others for the purposes of the comparison. To such a procedure there are several objections. It does not eliminate the factor of symbolism, and it does not take into account the relative frequencies of the phonemes in each language. If, for example, in comparing two particular languages, it were agreed that the labials would all be treated as resembling one another and the dentals likewise and if, in both languages, dentals were five times as frequent as labials, the possibility of chance resemblance would be much greater than if they were equal. This objection could, of course, be met in principle by a weighting in terms of frequency, but in actual practice it would be difficult to carry out.

A more desirable procedure would be the following. Let us suppose that we have a list of one thousand morphemes matched for meaning in the two languages. In language A the first morpheme is kan, "one." Instead of calculating the abstract probability of a form resembling kan sufficiently to be considered similar, let us actually compare kan in form with all the thousand items on the other list. Let us likewise compare the meaning "one" with all the meanings on the other list. The chance probability of the existence of a form resembling kan, "one," in both form and meaning in list B will then be the product of form resemblances and meaning resemblances divided by 1,000, the total number of items. We should then do this for each morpheme in list A and total the probabilities. As can be seen, this is a very tedious procedure. Moreover, it will not include resemblances due to symbolism.

A much more practical method, which takes into account both chance and symbolism, is simply to take a number of languages which are admittedly unrelated and ascertain the number of resemblances actually found. The difficulty here is that results will vary with the phonetic structure of the languages. A number of such counts indicates that approximately 4 per cent is the modal value, employing a very generous interpretation of what constitutes similarity. Where, however, the two languages are similar in the phonemic structure of their morphemes, the degree of resemblance can become significantly larger. For example, between Thai and Bur, a Nilotic language, which have very similar phonemic structures, it reaches 7 per cent. It can be safely asserted that a resemblance of 20 per cent in vocabulary always requires a historical explanation and that, unless similarity of phonetic structure leads to the expectation of a high degree of chance similarity, even 8 per cent is well beyond what can be expected without the intervention of historical factors. This factor of the similarity or difference of the phonemic structure of morphemes is so important that in doubtful cases a simplified version of the second test, that of matching lists, should probably be applied. We might compare a particular form in list B with all those in list A from the phonemic point of view only, allowing merely one meaning, that of its partner in list A, presumably the nearest semantic equivalent. We then compare with the expected

frequency of resemblances (which is, of course, smaller than by the first method) only those cases of resemblances on the list in which the two forms are matched as nearest semantic equivalents. Thus, if as our first matching pair we had A nem, B kan, "one," and later in the list A ken, B sa, "only," the resemblance between A ken, "only," and B kan, "one," would be disregarded as not occurring in a matching pair.

In actual fact, however, this test can probably be dispensed with, since the mere quantity of resemblances in the form and meaning of morphemes is not the decisive factor in more doubtful cases. There are additional considerations based on the weightings to be accorded to individual items and the further fact that isolated languages are seldom found. The bringing-in of closely related languages on each side introduces new factors of the highest importance, which should lead to a definite decision.

Other things being equal, the evidential value of a resemblance in form and meaning between elements in two languages is proportional to the length of the item. A comparison such as A, -k; B, -k, "in," is, from this point of view at least, less significant than such a resemblance as A, pegadu; B, fikato, "nose." More important is the following consideration. The unit of comparison is the morpheme with its variant allomorphs, if these exist. If the two languages agree in these variations, and particularly if the variants are rather different in phonemic content, we have not only the probability that such-and-such a sequence of phonemes will occur in a particular meaning but the additional factor that it will be accompanied by certain variations in certain combinations. Agreement in such arbitrary morphophonemic variations, particularly if suppletive, i. e., involving no phonemic resemblance between the variants, is of a totally different order of probability than the agreement in a nonvarying morpheme or one in which the languages do not exhibit the same variation. Even one instance of this is hardly possible without historical connection of some kind, and, since, moreover, it is hardly likely to be borrowed, it virtually guarantees genetic relationship. We may illustrate from English and German. The morpheme with the main alternant hæv, "have," in English resembles the German chief allomorph ha:b, "have,"

both in form and in meaning. In English, hæv alternates with hæ- before -z of the third person singular present (hæz, "has"). In German, correspondingly, ha:b has an alternant ha- in a similar environment, before -t, indicating third person singular present, to form ha-t, "has." Likewise, English gud, "good," has the alternant be- before -tər, "comparative" and -st, "superlative." Similarly, German gu:t, "good," has the alternant be- before -sər, "comparative," and -st, "superlative." The probability of all this being chance, particularly the latter, which is suppletive, is infinitesimal. Since it is precisely such arbitrary variations, "irregularities" in nontechnical language, which are subject to analogical pressure, they tend to be erased in one or the other language, even if some instances existed in the parent-languages. Where they exist, however, they are precious indications of a real historical connection.

More generally applicable are considerations arising from the fact that the comparison is only in rare instances between two isolated languages. The problem as to whether the resemblances between two languages are merely the result of chance plus symbolism can then be tested by a number of additional methods. Let us say that, as is frequently the case, one or more other languages or language groups resemble the two languages in question but in the same indecisive way, that is, that this third or fourth language is not conspicuously closer to one than to the other of the two languages with which we have been first concerned. The following fundamental probability consideration applies. The likelihood of finding a resemblance both in form and in meaning simultaneously in three languages is the square of its probability in two languages. In general, the original probability must be raised to the $n - 1$ power where a total of n languages is involved, just as the probability of throwing a 6 once on a die is $1/6$, but twice is $(1/6)^2$ or $1/36$. Similarly, if each of three languages shows a resemblance of 8 per cent to the other, which might in extreme cases be the result of mere chance, the expectation of the three languages all agreeing in some instance of resemblance in form and meaning will be $(8/100)^2$ or $4/10,000$. In 1,000 comparisons, agreement among all three languages should occur only 6.4 times, that is, it will occur in .0064, or less than 1 per cent, of the comparisons. Hence a

number of instances of such threefold agreements is highly significant. If four or more languages which are about equally distant from one another agree in a number of instances, a historical connection must be assumed, and if this agreement involves fundamental vocabulary or morphemes with a grammatical function, genetic explanation is the only tenable explanation.

This may be illustrated from the Afroasiatic (Hamito-Semitic) family of languages consisting of five languages or language groups—Egyptian, Berber, Semitic, Chad (Hausa and others), and Cushite. The forms involved are guaranteed as ancestral in each group by the requirement of earliest attestation, as in the requirement for Egyptian that it occur in the Pyramid Texts, our oldest document, or of appearance in at least two genetic subgroups (as in the case of Chad and Cushite), so that, in effect, we are comparing five languages. Allowing again the very high total of 8 per cent of chance resemblance between any two of the languages, the expected number of occurrences of morphemes similar in form and meaning in all five groups simultaneously becomes $(8/100)^4$ or $2,816/100,000,000$. Assuming that about 1,000 forms are being compared from each language, this leads to the expectation of $2,816/100,000$ of a morpheme. That is, if one compared a series of five unrelated languages at random, employing 1,000 words in each case, the operation would lead to a single successful case in approximately 35 such sets of comparisons. As a matter of fact, eleven morphemes are found in the case of Hamito-Semitic instead of the expected $1/35$. There is only an infinitesimal probability that this could be the result of pure chance. In this case, the morphemes involved include such examples as -t, fem. sing. and -ka, second person singular masculine possessive. Genetic relationship, of which there are many other indications, seems the only possible explanation here.

Languages should never be compared in isolation if closer relatives are at hand. For the tendency of those particular forms in a language which resemble another language or group of languages to reappear with considerable frequency in more closely related forms of speech is a valuable index of the existence of a

real historical connection. The statistical considerations involved may be illustrated once more from the Hamito-Semitic family. The question whether Hausa is indeed related to Egyptian, Semitic, Berber, and the Chad language has always been treated through isolated comparisons between Hausa and the other groups, while the existence of more than seventy languages of the Chad group which show a close and obvious relation to Hausa has been ignored.

A comparison of basic vocabulary between Hausa and Bedaaye, a contemporary language of the Cushite branch of Hamito-Semitic, shows 10 per cent agreement in vocabulary. It is clear that Hausa will have lost certain Proto-Hamito-Semitic words retained by Bedaaye, and vice versa. The percentage of retained vocabulary is expressed by a simple mathematical relation, the square root of the proportion of resemblances. The proportion of Hausa vocabulary which is of Proto-Hamito-Semitic origin should therefore be $\sqrt{10/100}$ or approximately 32/100. If we now take another Chad language belonging to a different subgroup than Hausa, namely, Musgu, the percentage of resemblance to Hausa is 20 per cent. Applying the same reasoning, the percentage of Hausa vocabulary retained from the time of separation from Musgu, that is, from the Proto-Chad period, is $\sqrt{20/100}$, or approximately 45/100. If, then, we take forms found in Hausa which resemble Egyptian, Berber, Semitic, or Cushite and because of the existence of a true genetic relationship these forms actually derive from Proto-Hamito-Semitic, they must also be Proto-Chad. Since Hausa has lost its forms since the Proto-Chad period independently of Musgu, which belongs to another subbranch, a true Proto-Hamito-Semitic form in Hausa should reappear by chance in Musgu $32/100 \div 45/100$ of the time, that is 32/45. On the other hand, if Hausa is not related to the other Hamito-Semitic languages, the apparent resemblances to them are accidental, and these words should reappear in Musgu no more frequently than any other, that is, 20 per cent of the time, 9/45 rather than 32/45. An actual count shows that, of 30 morphemes in Hausa which resemble those of branches other than Chad, 22 occur in Musgu. This is 22/30 or 33/45, remarkably close to the expected 32/45. On the other

hand, of 116 forms which show no resemblances to those of other Hamito-Semitic branches, only 14 occur in Musgu.

Beyond the frequency of resemblances and their distribution in other languages of the same group, the form which the resemblance take is likewise of importance. If the resemblances are actually the result of historical relationship, even cursory reconstruction should show greater resemblance in most cases between the reconstructed forms than between those of two isolated languages. If the resemblances are all convergences, on the whole, reconstruction should increase the difference of the forms. This can be done in a tentative manner as the comparison proceeds and without necessarily involving the full apparatus of formal historical reconstruction, which is often not feasible with poor material or where the relationship is fairly remote and no written records are available. If, for example, we compared present-day Hindustani and English, we would be struck by a number of resemblances in basic vocabulary, including numerals, but the hypothesis of chance convergence would certainly appear as a plausible alternative. Even without going beyond contemporary Germanic languages, on the one hand, and Indo-Iranian languages, on the other, reconstruction would show a strong tendency to convergence of forms as we went backward in time, suggesting a real historical connection. Thus English tuw resembles Hindustani dā:t only slightly. On the German side comparison with High German tsa:n already suggests a nasal consonant corresponding to the nasalization of the Hindustani vowel. Conjecture of a possible *tān or the like as a source of the English and German form is confirmed by the Dutch tand. On the other hand, comparison of Hindustani with other Aryan languages of India suggests that the Hindustani nasalized and long vowel results from a former short vowel and nasal consonant, as in Kashmiri and Sindhi dand. Reconstruction has thus brought the forms closer together.

Last, and very important, a degree of consistency in the sound correspondences is a strong indication of historical connection. Thus, reverting to the English-Hindustani comparison, the presence of t in English tuw, "two," ten, "ten," and tuw

"tooth" corresponding to Hindustani d in dō, das, and dā:t, respectively, is a strong indication of real historical relationship.

Assuming that such a relationship has been established, there still remains the problem of whether the resemblances in question can be explained by borrowing. While in particular instances the question of borrowing may be doubtful, I believe it is always possible to tell whether or not a mass of resemblances between two languages is the result of borrowing. The most important consideration is the a priori expectation and historical documentation of the thesis that borrowing in culture words is far more frequent than in fundamental vocabulary and that derivational, inflectional, pronominal morphemes and alternating allomorphs are subject to borrowing least frequently of all.

The oft repeated maxim of the superiority of grammatical over vocabulary evidence for relationship owes what validity it has to this relative impermeability of derivational and inflectional morphemes to borrowing. On the other hand, such elements are shorter, hence more often subject to convergence, and usually few in number, so that in themselves they are sometimes insufficient to lead to a decision. Lexical items are, it is true, more subject to borrowing, but their greater phonemic body and number give them certain compensatory advantages. While it cannot be said, a priori, that any single item might not on occasion be borrowed, fundamental vocabulary seems to be proof against mass borrowing. Swadesh, in a recent discussion of the problem of borrowing versus genetic explanations, presents quantitative evidence for the relative impermeability of fundamental vocabulary in several instances where the history of the language is known (Swadesh, 1951).

The presence of fundamental vocabulary resemblances well beyond chance expectation, not accompanied by resemblances in cultural vocabulary, is thus a sure indication of genetic relationship. This is a frequent, indeed normal, situation where a relationship is of a fairly remote order. Pronoun, body parts, etc., will agree while terms like "pot," "ax," "maize," will disagree. The assumption of borrowing here runs contrary to common sense and documented historic facts. A people so strongly influenced by

another that they borrow terms like "I," "one," "head," "blood," will surely have borrowed cultural terms also. Where the mass of resemblances is the result of borrowing, a definite source will appear. The forms will be too similar in view of the historical remoteness of the assumed relationship. Moreover, if, as is usual, the donor language is not isolated, the fact that the resemblances all point to one particular language in the family, usually a geographically adjacent one, will also be diagnostic. Thus the Romance loan words in English are almost all close to French, in addition to hardly penetrating the basic vocabulary of English. If English were really a Romance language, it would show roughly equal similarities to all the Romance languages. The absence of sound correspondences is not a sufficient criterion, since, where loans are numerous, they often show such correspondence. However, the presence of a special set of correspondences will be an important aid in distinguishing loans in doubtful instances. Thus French loan words in English show regular correspondences, such as Fr. š = Eng. č or Fr. ã = Eng. æn (šās:čæns; šāt:čænt; še:z:čejr, etc.).

Genetic relationship among languages is, in logical terminology, transitive. By a "transitive" relation is meant a relation such that, if it holds between A and B and between A and C, it must also hold between B and C. If our criteria are correct and languages do have single lines of origin, we should never be led by their application to a situation in which A appears to be related both to B and to C, but B and C themselves cannot be shown to be related. If this were so, A would consist equally of two diverse components, that is, would be a mixed language of elements of B and C. This situation is sometimes said to exist, and even on a mass scale. Africa is perhaps most frequently mentioned in this connection. Thus Boas (1929) writes: "... a large number of mixed languages occur in Africa. His [Lepsius'] conclusions are largely corroborated by more recent investigation of the Sudanese languages."

Close investigation shows that, of the hundreds of languages in Africa (800 is the conventional estimate), there is only one language concerning which the problem of genetic affiliation could

conceivably lead to two disparate classifications, the Mbugu language of Tanganyika. Even here the answer is clear that, in spite of the borrowing of Bantu prefixes and a large amount of vocabulary, mostly nonfundamental, the language belongs to the Cushite branch of Hamito-Semitic. The pronouns, verb forms, and almost all the fundamental vocabulary are Cushitic. The conventional African classification based on purely formal criteria, such as tone, combined with purely semantic, such as gender, had no connection with historical reality, and the necessarily contradictory results which followed led to the assumption of widespread mixture. If, as was done, we define a Sudanese language as monosyllabic, tonal, and genderless, and a Hamitic language as polysyllabic, toneless, and having sex gender, a polysyllabic, tonal language with sex gender (like Masai) will have to be interpreted as the result of a mixture of Sudanic and Hamitic elements.

The last full-scale treatment of this subject is Meillet's, which was followed by the counterarguments of Schuchardt, Boas, and others and a discussion of these objections by Meillet (1914). The present discussion is in fundamental agreement with Meillet in asserting that the genetic question always has a meaning and is susceptible of an unambiguous answer. Meillet differentiates between concrete grammatical resemblances involving both form and meaning and those involving meaning only without form, but only in passing. Similarly, he mentions rather casually the fact that fundamental vocabulary is not commonly borrowed, but does not exploit this insight. The advantages gained by collateral comparison with additional closely related languages, and the statistical significance of coincidences in three or more languages are not considered. The result is an unnecessarily skeptical attitude toward the possibilities of establishing genetic classification where there are no early written documents or where the grammatical apparatus is slight or nonexistent (e.g., Southeast Asia).

The objections of Schuchardt and Boas are in large part taken into account in the present analysis by the distinction between resemblances based on form and meaning which result from contact with other linguistic systems and those involving form only or meaning

only. It would perhaps be desirable to distinguish these by the terms "borrowing" and "influence," respectively. Justice is then done to Boas' insistence that diffusion is prominently operative in linguistic as in other cultural phenomena, by setting no limit to influence, which in the case of Creole language reaches its peak, while maintaining, in accordance with all the available evidence, that there are definite bounds to borrowing, since it tends to cluster in nonfundamental vocabulary and makes only rare and sporadic inroads into basic vocabulary and inflectional and derivational morphemes. What is commonly said about the grammatical effects of one language on another refers almost entirely to influence, not borrowing, in the sense of the terms as employed here.

In other words, the effects of one language upon another are extremely widespread, fundamental, and important. What is maintained here is merely that the results are of a kind that can be distinguished from those caused by genetic relationship. Nor is it asserted that the genetic affiliation of a language is the sole important historic fact concerning it. The effects of borrowing and influence, being more recent chronologically and giving specific insights into the nature of the contacts involved, may frequently be of greater significance to the ethnologist and culture historian than the factor of more remote genetic affiliation.

These two types of historical connections between languages are carefully distinguished by Trubetskoy. A group of languages which have affected one another by influence and borrowing and form a group analogous to a culture area is termed a Sprachbund, while a group of genetically linked languages is termed a Sprachfamilie. They become genera of the larger species, Sprachgruppe, taking in all types of historical connections between languages (Trubetskoy, 1928).

The common habit of confusing these two situations by the use of the term "mixed language," as though a language were a mechanical aggregate of a number of components which enter into it the same way but merely in different proportions that English is, say, 48 per cent Germanic, 43 per cent French, 4 per cent Arabic,

and 0.03 per cent Aztec (because of "tomato," "metate," etc.) is a gross oversimplification and fails to distinguish the different origin and function of the Germanic as opposed to the Romance-Latin and other components in English.

From what has been said, it should be evident that the establishment of genetic relationships among languages is no mere ou d'esprit. It is the indispensable preliminary to a determination of the causes of resemblances between languages by leaving borrowing as the only remaining source where more than chance resemblance does not lead to a hypothesis of relationship. Where such a relationship is present, it provides the basis for separation of autonomous from foreign elements through reconstruction of the ancestral language. Without such reconstruction, an understanding of the process of change in language undergoes a severe limitation to those few areas of the globe in which documented materials concerning the earlier forms of languages exist.

I. Selected Regional Sketches

A. Africa

The attempt to reduce the number of language families in Africa at all costs, leading to overambitious syntheses combined with a disregard of concrete resemblances in form and meaning between elements of language in favor of typological criteria, such as the presence of tone, noun classes, sex gender, monosyllabic roots, etc., has characterized African linguistic classification from the earliest systematic attempts (Lepsius, F. Müller, etc.) onward.

The dominant classification in England and the United States has been a kind of synthesis, varying in details with different writers, based chiefly on the investigations of Westermann on the Bantu languages and Meinhof on the Hamitic. Clear statements of the basis of this classification can be found in Werner (1915) and

in Tucker (1940), as well as elsewhere. According to this view, there are three great indigenous language families in Africa—Sudanic, Bantu, and Hamitic, with Semitic as a separate but late intrusion and Bushman as possibly related to Sudanic. A disputed point has been the status of Hottentot, which most assign to Hamitic with Meinhof but which some classify with Bushman to form a Khoisan family, while others leave it independent or at any rate unclassified. Each of the three main families has its basic characteristics. Thus Sudanic is monosyllabic, tonal, lacks stress, grammatical gender, and all inflection, and places the genitive before the possessed noun. Hamitic, at the opposite extreme, is defined as polysyllabic, possessing Ablaut variation, having grammatical gender and inflection, lacking tone, and placing the genitive after the noun. In addition, it possesses the characteristic of polarity, which can best be illustrated by an example. The Somali language uses the same formative for the singular of the masculine and the plural of the feminine, while another element marks simultaneously the singular of the feminine and the plural of the masculine. Meinhof often expressed the opinion that the Bantu languages, which are assigned characteristics almost midway between the Sudanic and Hamitic families, were the result of a mixture of the two or, as he once expressed it, "had a Hamitic father and Sudanic mother" (Meinhof, 1912).

It is admitted that few languages exhibit the traits of one of these families in full purity. Deviations from the ideal pattern are attributed to influences of one family on the other. It is held that such intimate fusions may result that the choice of the fundamental component can in certain cases be made only by an arbitrary decision. Such mixed groups of languages are the Semi-Bantu, formed from Sudanic and Bantu; Nilo-Hamitic, a fusion of Sudanic with Hamitic; and, in the view of many, Hottentot, with a Sudanic-like Bushman element and a Hamitic element.

It is clear that by applying such criteria, which have no reference to the concrete relations between the form and the meaning of specific linguistic signs, Chinese is a Sudanic language and Old French is Hamitic. The latter, indeed, possesses a very

striking bit of polarity in the use of -s to indicate the nominative singular and plural accusative of the noun as opposed to a zero suffix indicating the accusative singular and nominative plural (e.g., murs: mur = mur: murs). In addition, it possesses gender, Ablaut, and all the other stated characteristics of Hamitic speech. On the other hand, we are led to a crowning absurdity, in that forms of speech that are probably mutually intelligible can be classified as genetically distinct. Thus Meinhof, in classifying the languages of Kordofan, west of the Upper Nile, paid no attention to any other factor than the existence or absence of class prefixes in the noun. Three of these languages—Tegele, Tagoy, and Tumele—are similar, probably to the point of mutual intelligibility. Meinhof (1915-19) states: "A comparison of vocabulary shows that the numerals [sc. of Tegele] completely agree with those of Tumele. Moreover they are for the most part identical with the Tagoy numerals. Besides, a number of word stems and some verb forms of Tegele are identical with Tagoy and Tumele. But the grammatical structure of the noun indicates that Tegele is a Sudanic language because noun classification is absent while Tagoy and Tumele have clear noun classes. Apparently there has been a mixture of two diverse elements."

The other classification which has enjoyed currency is that of A. Drexel, adopted with a few modifications by Schmidt and by others in their respective volumes on the languages of the world. The Drexel classification embodies an attempt to demonstrate Sprachenkreise in Africa parallel to the Kulturkreise of the Graebner-Schmidt culture-historical school. This involves such violence to linguistic facts as the separation of the closely knit Mandingo group of languages into two unrelated families and the assumption of special Fulani-Malayo-Polynesian and Kanuri-Sumerian connections. There is no clear statement of the method employed in arriving at such conclusions.

The recent Greenberg (1949-50) classification concentrates on specific criteria which are relevant for actual historical relationship. The large heterogeneous Sudanic group, to which Westermann, in his more recent writings, denied genetic unity is split into a number of major and some minor stocks. The most important of those,

Westermann's West Sudanic, shows a genetic relationship to Bantu, as evidenced by a mass of vocabulary resemblances, agreement in noun-class affixes, and phonetic correspondences, including those relating to tone, to which Westermann himself had drawn attention and to which he had even attributed a genetic significance, without, however, modifying his general scheme of language families to take account of it. The Semi-Bantu languages show a special resemblance to the Bantu languages simply because they belong to the same subgroup of languages in the larger family, to which the name "Niger-Congo" is applied. Since these Semi-Bantu languages do not possess common features as against Bantu, the Bantu language must be classified as merely one of over twenty subgroups within that one of the fifteen branches of the vast Niger-Congo family which includes both Bantu and "Semi-Bantu" languages.

Other major independent families formerly classified as Sudanic are Central Saharan, Central Sudanic, and Eastern Sudanic. This latter family includes the so-called "Nilo-Hamitic" languages, along with the closely related Nilotic languages in a single sub-family.

Hottentot is treated along with the central Bushman languages as a single subgroup within the Khoisan languages, the other branches being Northern Bushman and Southern Bushman. The Khoisan languages, in turn, are related to Sandawe and Hatsa in East Africa to form a single Click family. Of Meinhof's various proposed extensions of Hamitic, Fulani is assigned to the westernmost subfamily of Niger-Congo; the "Nilo-Hamitic" languages (Masai, Nandi, etc.) are classed as Eastern Sudanic; and Hottentot belongs to the Click family. Hausa, along with numerous other languages of the Chad family, is put, along with the traditionally Hamitic Berber, Cushite, and Ancient Egyptian and with Semitic, into the Hamito-Semitic family, for which the name "Afroasiatic" is proposed, since there is no linguistic justification for granting Semitic a special status. The term "Hamitic," which has been the basis of much pseudo-historical and pseudo-physical reconstruction in Africa, is thus abandoned as not designating a valid linguistic entity. The Afroasiatic family thus consists of five co-ordinate

branches: (1) Berber, (2) Egyptian, (3) Semitic, (4) Cushite, and (5) Chad.

The Greenberg classification assumes a total of sixteen independent families in Africa. There is some possibility of a reduction in this total. The hypotheses of a Kunama-Eastern Sudanic and a Songhai-Niger-Congo relationship, in particular, are worth investigating.

Westermann has indicated his adherence to this new classification in all essentials and is expected to espouse it in a forthcoming article in the journal Africa.³

B. Oceania

There is general agreement on the existence of only two extensive groups of related languages in Oceania—the Malayo-Polynesian and the Australian. The remaining families are the Tasmanian and a whole series of unrelated language families in New Guinea and neighboring islands, to which the cover-name "Papuan" is applied, with the general understanding that there is no proof or even likelihood that these languages form a single stock. Regarding Malayo-Polynesian, there is general consensus concerning which languages are to be included in the family, and the historical work of reconstruction of the ancestral Malayo-Polynesian and other languages will be considered in the following section on "Southeast Asia."

For the other large group, the Australian languages, although the existence of widespread relationships within the continent is asserted by all investigators, there is lack of unanimity regarding the number of families, some maintaining the unity of Australian languages and others denying it.

The linguists of the period before W. Schmidt's important work were acquainted almost exclusively with the languages of the large group which covers all the south and much of the north of the

continent and ignored or were unaware of certain languages of the extreme northwestern and north-central parts of Australia which differ considerably from the great mass of Australian languages. These observers, therefore, assumed the unity of all Australian languages and were concerned chiefly with hypotheses of outside connections, with Africa, with India (Dravidian), or, in the case of Trombetti, with an Australian-Papuan-Andamanese group. This latter attempt, like all the others, proved abortive in this instance, if for no other reason than that the Papuan member is no linguistic unit of any sort (Ray, 1907).

It was Schmidt (1913, 1914, 1917-18) who laid the foundations of a more careful study of the problem in a series of articles in Anthropos, later republished as Die Gliederung der australischen Sprachen (1919). Schmidt distinguishes two main families of Australian languages: the southern, which covers approximately the southern two-thirds of the continent, and a northern. He explicitly denies the existence of a genetic relationship between these two groups. Unlike the southern family, which constitutes a true genetic unity, the northern, according to Schmidt, is not a family at all but consists of numerous diverse, unrelated forms of speech. In the light of clear statements to this effect, it is difficult to know what is meant in a historical sense by Schmidt's threefold division of these northern languages into those whose words end in consonants as well as vowels, those whose words end in vowels only, and those whose words end in vowels and liquids but not in other consonants. This last group occupies, according to Schmidt, an intermediate position between the other two, probably through a process of language mixture. This threefold division of the northern languages, as well as the separation into a northern and a southern family, seems strongly motivated by an attempt at correlation with the Kulturkreise established in this area by the ethnological school of which Schmidt is a leading exponent. Kroeber (1924), in a review of Schmidt's work, criticized this division on the ground of obvious fundamental vocabulary resemblances between the northern and southern languages. He followed this up with a study of the distribution of common vocabulary items, which showed a sublime disregard in their distribution for the

fundamental east-west dividing line which Schmidt had drawn across the Australian continent.

In a series of articles in *Oceania* (1939-40, 1941-43), Capell made substantial contributions to our knowledge of the languages of the northwestern and north-central parts of the continent and also revealed the surprising fact that many of these languages had noun-prefix classes resembling those of the Bantu languages in Africa in their general functioning but, one should hasten to add, without specific resemblances to them in form and meaning. Capell asserts the fundamental unity of all Australian languages. He divides them into suffixing languages, roughly equivalent to Schmidt's southern family, and prefixing languages, corresponding to Schmidt's northern division. The criterion employed is existence of verb suffixes or prefixes to form tenses and moods and to indicate pronominal reference. It is admitted that the northern languages are, to some extent, suffixing also. Within the northern group we have, again, a threefold division on principles different from those of Schmidt. Groups with multiple noun classes, two classes, and no classes are distinguished. Capell admits, in effect, that this is not a genetic analysis. It leads, as he himself points out, to an inevitable cul-de-sac similar to that of Meinhof in Africa, cited above. We are confronted with a pair of languages—Nungali and Djämindjung—which are almost identical except that Nungali has noun classes and Djämindjung has none. A similar pair is Maung and Iwaidja. Concerning these latter, Capell observes: "It is safe to say, however, that had Iwaidja multiple classification, it would hardly be more than a dialect of Maung" (Capell, 1939-40, p. 420).

The solution suggested here is a simple one, if one keeps in mind a primary canon of classification, one so obvious that it would hardly seem to need statement, yet is frequently disregarded in practice. Languages should be classified on linguistic evidence alone. Among the irrelevancies to be excluded is the extent of the area in which the language is found and the number of speakers. There is no reason to expect that families of genetically equal rank should necessarily occupy territories approximately equal in extent.

Germanic and Tokharian are coordinate branches of Indo-European, but a greater contrast in territory and population could hardly be imagined. Germanic covers substantial portions of four continents and numbers hundreds of millions of speakers. Tokharian has no speakers at all, since it is extinct.

The extent of fundamental vocabulary resemblance, including pronouns, among all languages in Australia and the specific similarities in the noun prefixes which connect many north Australian languages provide sufficient evidence of a single Australian family. This family has numerous subgroups, certainly at least forty, of which the large southern subgroup is just one which has spread over most of the continent (including the Murngin languages in north-east Arnhemland and the languages of the western Torres Straits Islands). The ancestral Australian language had noun classes, and the southern subgroup has, like some of the northern languages (the prefixing, classless language of Capell's classification), lost these classes. It still maintains a survival, however, in the distinction of a masculine and a feminine singular pronoun found in certain southern languages in which the affirmatives employed resemble those of the masculine and feminine singular classes among the class languages.

C. Southeast Asia

There are sharp differences of opinion regarding linguistic relationships in this area. The following are the outstanding problems: (1) the validity of Schmidt's hypothesis of an Austroasiatic family consisting of Mon-Khmer, Munda, and other languages; (2) the validity of Schmidt's Austric hypothesis connecting Austroasiatic in turn with Malayo-Polynesian; (3) the affiliations of Thai and Annamite, connected by some with Chinese in one subbranch of the Sino-Tibetan family, while others place Thai with Kadai and Indonesian (Benedict) and Annamite with Austroasiatic (Schmidt and others); (4) the linguistic position of the Man (Miao-Yao) and Min-Hsia dialects spoken by aboriginal populations in China.

Accepting certain earlier suggestions and adding some of his own, Schmidt (1906) has proposed that the following groups of

languages are related to one another in his Austroasiatic stock: (1) Mon-Khmer, (2) the Palaung-Wa languages of the middle Salween, (3) Semang-Sakai, (4) Khasi, (5) Nicobarese, (6) the Munda group, (7) Annamite-Muong, (8) the Cham group. If we except Cham, which most writers consider Malayo-Polynesian, a conclusion which can hardly be doubted, then all these languages share numerous resemblances in fundamental vocabulary, extending to pronouns. Moreover, excepting Annamite, which has shed all its morphological processes, there are certain important derivational morphemes whose rather uncommon formal nature (infixes), combined with their basic functions in the grammar, absolutely excludes chance and makes borrowing a completely improbable explanation. I do not see how such coincidences as an infixed -m in the Mon of Burma and the languages of the geographically remote Nicobar islands, both with agentive meaning, to mention only one of a number of such instances, can be the result of anything but genetic relationship.

Maspero has sought to demonstrate a close connection between Annamite and Thai, which he considers to be Sino-Tibetan. This case rests chiefly on the irrelevant argument from form only—the monosyllabism and tonicity of Annamite, in which it resembles Thai and Chinese. The extensive lexical resemblances to Thai, which hardly touch basic vocabulary, must be looked upon as mostly borrowing with some convergence. On the other hand, the mass of fundamental vocabulary points clearly in the direction of the Austroasiatic languages, and I do not see how any hypothesis of borrowing can explain it. If borrowed, the source is not evident, since Annamite now resembles one, now another, of the Austroasiatic languages. It often shows an independent development from a hypothetical reconstruction which can hardly be the result of anything but internal development from the ancestral Austroasiatic form. Thus Annamite mōt, "one," makes sense as an independent contraction from *moyat, found in this form only in the distant Mundari language of India. The language geographically nearest to Annamite Khmer has muy, presumably <moy with loss of final -at. Santali, the chief Munda language, has mit < *miyat < moyat. The absence of the modest morphological apparatus of other Austroasiatic languages in Annamite cannot be used as an argument

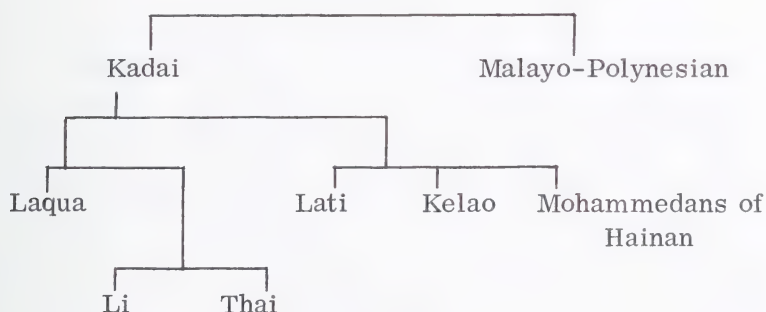
for any other relationship. The ancient maxim ex nihilo nihil fit may be appropriately applied in this instance.

Schmidt's further hypothesis of the relationship of Austroasiatic to the Malayo-Polynesian languages is of a far more doubtful nature. Most of the numerous etymologies proposed by Schmidt are either semantically or phonetically improbable or not attested from a sufficient variety of languages in one family or the other. Even with these eliminated, there remains a considerable number of plausible, or at least possible, etymologies, but very few of these are basic. Both language families employ prefixes and infixes, and the latter mechanism is certainly not very common. However, concrete resemblances in form and meaning of these elements which can reasonably be attributed to the parent-language of both groups are very few. Only pa-, causative, seems certain. In view of this, the Austric hypothesis cannot be accepted on present evidence. It needs to be reworked, using Dempwolff and Dyen's reconstructed Malayo-Polynesian forms, as well as taking into account the Thai and Kadai languages, which, as we shall see, are related to Malayo-Polynesian.

The traditional theory regarding Thai is that it forms, along with Chinese, the Sinitic branch of Sino-Tibetan. Benedict has proposed the relationship of Thai to the Kadai group, in which he includes certain languages of northern Indo-China, southern continental China, and the Li dialects of the island of Hainan. He has further posited the relationship of this Thai-Kadai family to Malayo-Polynesian (Benedict, 1942). Of the relation of Thai to the Kadai languages, which in the case of the Li dialects is particularly close, there can be no reasonable doubt. At the least, the traditional theory would have to be revised to include the Kadai languages, along with Thai, in Sinitic. I believe, however, that the connection of Thai with Chinese and Sino-Tibetan must be abandoned altogether and that Benedict's thesis is essentially correct. Thai resemblances to Chinese are clearly borrowings. They include the numerals from 3 on and a number of other words which are certainly the result of cultural contact. Thai is otherwise so aberrant that it must be at least another independent branch of Sino-Tibetan. Yet, when

resemblances are found, the forms are always like Chinese—altogether too like Chinese, one should add. Applying a test suggested earlier, it is found that those words in Thai which resemble Malayo-Polynesian tend to reappear in the Kadai languages, while those which are like Chinese do so only rarely. The proportion of fundamental vocabulary resemblances between Thai-Kadai and Malayo-Polynesian runs to quite a high number, far beyond chance and hardly explainable by borrowing, in view of the geographical distances involved.

I believe that Benedict's thesis needs restatement in some details of grouping, where, as so often happens, he has been led astray by nonlinguistic considerations, in this case the importance of Thai as a culture language. Thai shows special resemblance to the Li dialects of such far-reaching importance that Benedict's twofold division of Kadai into Laqua-Li and Lati-Kelao must be emended to put Thai along with Li in the first subgroup. In addition, the language of the Mohammedan population of Hainan does not belong, interestingly enough, with the Li dialects of the rest of the island but forms a third subdivision alongside the continental Lati-Kelao. The emended picture is shown in the accompanying diagram.



The Miao-Yao dialects of China have variously been called "Mon-Khmer" (i.e., Austroasiatic), "Sino-Tibetan," or "independent." There seems no good reason to classify them as other than a separate branch of Sino-Tibetan, no more divergent than, say, the Karen

languages of Burma. The evidence cannot be summarized here. The Min-Hsia language has been variously called a "Sino-Tibetan" or "Austroasiatic" language with a Chinese overlay. It likewise seems to be Sino-Tibetan. When the obvious Chinese borrowings are accounted for, the language still appears to show a special affinity to Chinese in fundamentals, so that it should probably be included in the Sinitic subbranch.

The question is here raised concerning the status of the Nehari language of India, classed by Grierson as Munda. It has been strongly influenced by Kurku, a neighboring Munda language; but, when allowance is made for this, the fundamental vocabulary and morphology of the language do not resemble those of any other family in the area. It may therefore be the only language of an independent stock. More material is needed to decide this question.

In summary, the language families of Southeast Asia are probably the following: (1) Sino-Tibetan, (2) Austroasiatic, (3) Kadai-Malayo-Polynesian, (4) Andaman Islands, (5) Nehari (?).

D. America North of Mexico

The present discussion is restricted to a few remarks of somewhat impressionistic character because of my lack of acquaintance with the linguistic data from this area. However, even cursory investigation of the celebrated "disputed" cases, such as Athabaskan-Tlingit-Haida and Algonkin-Wiyot-Yurok, indicate that these relationships are not very distant ones and, indeed, are evident on inspection. Even the much larger Macro-Penutian grouping seems well within the bounds of what can be accepted without more elaborate investigation and marshaling of supporting evidence. The difference between Oregon and California Penutian is comparable to that between any two of the subdivisions of the Eastern Sudanic family in Africa. The status of Algonkin-Mosan and Hokan-Siouan and the position of Zuni (which Sapir himself entered in the Azteco-Tanoan family with a query) strike me as the most doubtful points of Sapir's sixfold classification. The existence of a Gulf group, as

set forth recently by Haas, with a membership of Tunican, Natchez, Muskogean and Timucua appears certain, as does the relationship of the Coahuiltecan languages both to the Gulf group and to the California Hokan in a single complex. Likewise, as Sapir pointed out, Yuki is probably no more than a somewhat divergent California Hokan language. The connection of Siouan-Yuchi and Iroquois-Caddoan with these languages is possible but far from immediately evident. Within Algonkin-Mosan, Salish-Chemakuan-Wakashan seems certain, as does Algonkin-Beothuk-Wiyot-Yurok (Beothuk may well be an Algonkin language). On the other hand, the relation of these two groups to each other and to Kutenai requires further investigation. Within the Azteco-Tanoan group it is clear that Kiowa is close to Tanoan and that Kiowa-Tanoan is related to Uto-Aztecan, as demonstrated by Trager and Whorf. The position of Zuni, as noted above, is very doubtful.

IV. Language and Historical Reconstruction

Ethnologists are rightly interested in comparative linguistic work, not so much for its own sake as for the light it sheds on other aspects of culture history. The basis for any discussion of this subject is inevitably the classic treatment of Sapir in his Time Perspective in Aboriginal American Culture. In spite of the brevity of this discussion, it is astonishingly complete, and there is little one would want to add to it, in spite of the lapse of time. The single most significant comment that might be made is that it serves as an essentially adequate basis for work in this field but that relatively little has been done toward the actual application of its principles. The problems involved are some of the most difficult in scientific co-operation and not easily solved. On the one hand, linguistic evidence is peculiarly suited to misapplication by ethnologists, who sometimes tend to use it mechanically and without at least an elementary understanding of the linguistic method involved. On the other hand, the linguist is often not greatly interested in problems of culture history, and the recent trend toward concentration in descriptive problems of linguistic structure draws him still further from the ordinary preoccupations

of archeologists and historically oriented ethnologists. Perhaps the ultimate solution is an intermediate science, ethnolinguistics, which will treat the very important interstitial problems, both synchronic and historical, which lie between the recognized fields of ethnology and linguistics.

The most important and promising recent development in this area is the possibility of establishing at least an approximate chronology for linguistic events in place of the relative time relations of classical historical linguistics. This method, known as "glotto-chronology" and developed chiefly by Swadesh and Lees, works on the assumption that rate of change in basic vocabulary is relatively constant. A chronological time scale is provided by comparisons of vocabulary from different time periods of the same languages in areas with recorded history. The results thus far indicate an average of ca. 81 per cent retention of basic vocabulary in one millennium. Thus, by comparing two related languages for which no earlier recorded material is available, the percentage of basic vocabulary differences will allow of an approximation of the date of separation of the two forms of speech.

By combining with this a rigorous application of Sapir's insight regarding the probable center of origin of a linguistic group, on the basis of a center of gravity calculated from the distribution of genetic subgroups, an instrument of historical reconstruction surpassing any previous use of linguistic data for these purposes becomes possible.

The center-of-gravity method may be briefly described as follows: Within each of the genetic subgroups of a linguistic family, the center of distribution is selected. If the subgroup is itself divided into clear dialect areas, the central point of each dialect area is calculated and the position of all is averaged to obtain the probable center of dispersal of the subgroup. The centers of the various subgroups are then averaged to obtain the most probable point of origin for the entire family. A correction in order to minimize the influence of single aberrant groups may be made by calculating a corrected center of gravity from the one reached by the above

method. The distance of the center of each subfamily is calculated from the center of gravity of the whole family. Then those subgroups which are most distant are weighted least, by multiplying the center of position of each subgroup by the reciprocal of the ratio of its distance to that of the most distant subgroup, and thus calculating a corrected value. Such results, mechanically arrived at, should, of course, be evaluated in terms of geographical and other collateral knowledge.

V. Goals, Methods, and Prospects

The goals and methods of comparative linguistics, particularly as applied to the field of primitive languages, are clear and generally agreed upon. The aims of this branch of science might be phrased in terms of the establishment of all possible genetic relationships between languages, the detection of all borrowings and the direction they have taken, and the maximal reconstruction of the ancestral languages which have given rise to the present languages. This is of value not only for its own sake and because these results can be employed toward general historical reconstruction but also because it gives us our basic knowledge of historic change in language under diverse circumstances. It is not until considerable data have been amassed in this field and a considerable variety of historical development in different areas has been traced that questions regarding overall change from one morphological or phonological type to another, leading to general laws of linguistic change, can ever be possible.

Problems of method, also, are in the main agreed upon. These resolve themselves into two main types: those pertaining to the determination of relationship and those concerning reconstruction. The latter problems are less controversial, and, in the United States at least, there is general agreement on the employment of what are essentially the procedures of classical Indo-European linguistics. The problems of establishing genetic relationships beyond the most self-evident ones, such as those of Powell in North America, admittedly involve more differences of opinion both

in Europe and in America. The abandonment of concrete criteria in favor of meaning without form or form without meaning and the abandonment of the traditional view regarding genetic relationship in some parts of the world in favor of the apparent profundity of analyses in terms of superposed strata have led only to increasing confusion and conflicting analyses, as they inevitably must. Moreover, only on the basis of clearly defined families established through specific form-meaning resemblances can reconstruction be attempted and with it the possibility of the study of historic process in language.

The greatest single obstacle to the rapid future growth of the field does not lie, however, in any conflict regarding aims or methods. It is rather the lack of trained people in sufficient number to provide the descriptive data for a vast number of languages, some of them near extinction. The topheavy concentration of linguistic scientists in the area of a very small number of language families of Eurasia and the extreme paucity of fully trained workers in such large areas as South America and Oceania are a grave handicap to future development of this field, as well as of linguistics as a whole. At the last meeting of the Linguistic Society of America, approximately 90 per cent of the papers presented on specific languages concerned a single language family, Indo-European.

The absence of effective liaison even between anthropological linguists and other branches of anthropology and its nonexistence in the case of other linguists, while an understandable consequence of the contemporary trend toward specialization, are likewise dangerous. Unless these situations are met and to some degree overcome, comparative linguistics must fall far short of the inherent possibilities afforded by the transparency of its material and the sophistication of its method of making a unique and significant contribution to the science of anthropology as a whole.

NOTES

1. The reconstructions of the neo-linguistic school are not generally accepted by other scholars. For an exposition of neo-linguistic method, see G. Bonfante (1945). For a hostile critique see Robert Hall, Jr. (1946). It should perhaps be added that the approach of L. Hjelmslev in Denmark seems to exclude diachronic problems from language in principle but that this remains hardly more than a theoretic model.

2. Examples are the recent studies of Grimm's laws and other changes in Germanic by Twaddel and others, and various studies by Martinet of sound shifts (e. g. , 1950).

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It is the great merit of Benjamin Whorf that by the enthusiasm and persuasiveness with which he presented his point of view he has become a major factor in arousing a widespread and growing interest in some of the most significant problems in the relation between linguistic and nonlinguistic phenomena. The present discussion is intended merely as a brief review of some of the basic issues raised by his writings. Occasional reference will be made also to similarly oriented approaches of both American and European writers. It seemed especially worthwhile to call attention to some of this latter work, since it can lend additional perspective to our understanding of the problems and since these contributions are apparently not as well known as might be expected in view of their inherent interest and their relevance to issues now being discussed in the United States.

There is a European tradition, particularly strong in the German-speaking world, which can be traced back at least as far as Herder in the latter part of the eighteenth century, but which first assumed central importance in the writings of Von Humboldt. The influence, direct and indirect, of Von Humboldt on the Continent has been a profound and continuing one, and may be seen in contemporaries or near-contemporaries such as Ernst Cassirer in philosophy and Johann Leo Weisgerber and Jost Trier in linguistics. A few citations may serve to illustrate the general resemblance of the approaches of these writers to that of Whorf. Thus Cassirer, himself a prominent exponent of this point of view, sums up the position of Von Humboldt in the following words: "The difference between languages derives, in his view, less from differences in sounds and signs than from differences of world-view" (1933: 20). Weisgerber writes concerning language: "As an intermediate psychic realm, it is clearly distinct from the area of 'objective meanings,' particularly in

the sense that it is not a simple reflection of the world of objects, but rather embodies the result of an intellectual remolding of this world" (1949: 13).

Inasmuch as these resemblances in approach extend beyond such generalities to specific details, reference is made to them whenever relevant in the course of this exposition. One characteristic difference between European and American approaches, which lies in the sphere of value judgments, may be pointed out; European writers have with some exceptions, taken a view of primitive mentality similar to that of Lévy-Bruhl. The world perspective stated to be revealed shows the primitive at an early prelogical stage of development. In the United States an equality of valuation is maintained, the scale, if anything, tending to weigh in favor of the primitive. (See, e.g., Whorf 1952: 31 and Lee 1940.)

The present paper is primarily analytic in scope. It is an attempt to classify the extremely varied assertions which have been made connecting linguistic and nonlinguistic behavior and, in regard to each class, to raise the question as to what types of evidence are relevant in establishing and verifying hypotheses.

In any specific attempt to connect linguistic with nonlinguistic phenomena, we may ask three kinds of questions: (1) What kinds of linguistic facts are being adduced in evidence? (2) With what other phenomena is a connection being made? (3) What is the nature of this connection? Under the first of these rubrics we ask whether the linguistic facts pertain to phonology, to grammar, or to semantics. If, for example, they pertain to semantics, we may further inquire whether they are based on the meanings of some particular morpheme, of a morpheme class, of a construction, etc. Under the second heading come such questions as the following: Are the linguistic phenomena cited to be associated with facts of sense perception, logic, individual behavior, or cultural behavior? The third category involves the nature of the asserted connection. Is it a causal relation and, if so, which is the causal factor, the linguistic or the nonlinguistic? Or is it neither, the connection between the two being the result of a third factor? This is perhaps what is intended by some who do not view either the nonlinguistic or linguistic phenomena as primary but consider both the re-

sultant of a third element, a "world view." Moreover, causality should not be confused with predictability. Perhaps only a predictability relation is discerned in some cases, without any claim to knowledge of the causal factors involved. Or it may be that the connection is merely a statistical probability of more than chance correlation between some aspects of language and extra-linguistic phenomena.

The present paper is ordered about the first of these questions, the nature of the linguistic unit involved, since it seemed to provide the clearest focus of discussion. In what follows, no complete review of all possible or actual hypotheses is attempted. Attention is concentrated on those types of inference which have been most prominent in the literature.

I. Inferences from Phonology

Phonology has exercised a twin attraction and repulsion on those seeking to establish connections between linguistic and extralinguistic phenomena. On the one hand, this has been the area of dominant interest and greatest achievement for modern structural linguistics, thus providing linguistic data whose rigorous formulation furnishes excellent systematic material for further comparison with other classes of data. On the other hand, concrete and plausible theories are difficult to formulate because phonology is that aspect of language which appears to be the most autonomous and self-contained in its functioning and hence the most difficult to relate to other phenomena. With what cultural or other facts would one connect a contrast between aspirated and nonaspirated consonants in a given language? Where is the tertium comparationis?

Two approaches seem possible, the direct and the indirect. In the former, phonological phenomena are compared directly with extralinguistic events. In the latter, the comparison is mediated by first seeking correspondence between phonological and nonphonologic aspects of language and then connecting the latter with extralinguistic data.

The direct approach might well be based on something like Jakobson, Fant and Halle's over-all analysis of principles of phonemic

contrast in terms of a small number of basic oppositions (1952). One might then proceed inductively and cross-culturally investigating whether certain principles of contrast show significant correlations with certain social or cultural features. Beyond the methodological difficulties inherent in all cross-cultural attempts, there remains the fact that favorable results would seem difficult to interpret by any plausible theories of interaction.

The indirect approach is exemplified in the ingenious scheme of Bally (1944) by which, in conformity with a widely held view regarding French and German national character, he seeks to characterize the French language as analytic and abstract as against the synthetic, phenomenalistic tendencies of German. The typical French word order, modified-modifier, as opposed to the German order, modifier-modified is correlated with a tendency toward final stress in French as against initial stress in German (e.g., French chapeau gris vs. German grauer Hut). This, in turn, is brought into connection with the French preference for open syllables, the absence of complex phonemes (e.g., affricates) and of falling diphthongs. The opposite characteristics are found in German. We have, then, a proposed correlation between certain prevalent types of construction in morphology and certain phonological traits.

The question as to whether these morphological-phonological correlations are valid—a matter which might be tested by cross-linguistic comparisons—is clearly independent of the problem of the demonstrative values of these element-orders as marks of two types of mentality and cultural expression. One might well be valid without the other. Any attempt to show agreement between grammar and phonology, as, for example, Jakobson's systematic discussion of the matter (1948), would give indirect relevance to phonology, once hypotheses linking morphology and cultural features are advanced. The cumulative influence, in turn, of foreign patterns through the medium of loan words on the phonological structure of a language is emphasized by Høijer in his discussion of linguistic and cultural change (1948).

In an area other than one of cultural behavior, that of sound-perception, the connection between phonological structure and external phenomena is obvious. That the phonological structure of one's own

language in respect both of constituent phonemes and of permitted combinations, cited by Whorf as a linguistic pattern phenomenon par excellence, is a factor in the perception of unfamiliar sounds is clear from gross observation of foreign-language learning, the teaching of general phonetics, and similar experiences. Bloomfield has suggested a number of phenomena of perception and articulation in this area which, though plausible, are evidently not the result of observation under scientifically controlled conditions (1933: 80-84). These hypotheses might well be made the subject of co-operative experimental investigation by psychologists and linguists. Besides such psychological experimentation, there is available a considerable amount of data from historical linguistics regarding the systematic treatment of foreign sounds in loan words by various linguistic communities, which are relevant for the same problem.

II. Inferences from Semantics

A. Terminology

The great majority of inferences from language has been drawn from semantics, for the obvious reason that, outside of linguistic meanings (discussed below), the referents involved in the meaning relation are nonlinguistic events. Before approaching this complex field, it will be useful to specify a few definitions distinguishing different kinds of meanings. Some of these were first used by Bloomfield in his well-known book (1933), others by Nida (1951). In a few cases I have reluctantly added terms of my own.

1. A sememe is the meaning of a morpheme (e.g., of "hand," "-ing").
2. An episememe is the meaning of a construction (e.g., possession, actor-action).
3. A macrosememe is the meaning of an idiom. It applies in those cases where the meaning of a complex whole cannot be predicted from the constituent sememes and episememes (e.g., of "I'm from Missouri" in the meaning "I am skeptical").
4. An ethnosememe is a meaning whose referent involves the nonlinguistic aspects of a situation (e.g., of "house").
5. A linguisememe is a meaning whose referent involves the linguistic aspects of a situation (e.g., of "to" with the infinitive). The

division into ethnosememes and linguisememes involves a separate basis of classification and cuts across the distinction of sememe, episememe, and macrosememe.

6. Elementary meaning unit (E.M.U.). This is a cover term for sememes, episememes, and macrosememes, the elementary units which in combination make up more complex linguistic forms up to sentence.

7. Complex meaning unit (C.M.U.). The meaning of a structural complex containing more than one E.M.U. (e.g., the meaning of a phrase).

8. Sentential meaning. The meaning of a maximal linguistic structure (i.e., of a sentence). It is a special case of complex meaning unit (C.M.U.).

9. Generic meaning. The meaning common to a specified group of E.M.U.'s, e.g., "male" in English as a common meaning in the following kinship terms: father, son, brother, uncle, nephew, grandfather, grandson.

Corresponding to the terms sememe, episememe, and macrosememe we have seme, episeme, and macroseme. These latter are subvariants of the respective units. Seme : sememe : : phone : phoneme. For example, the sememe or total meaning of the morpheme "table" would include as individual semes the meaning in "statistical table," in "table of contents," and the meaning of "table" when it refers to a four-legged flat-topped object.

The following discussion is based on the distinction that can be made between two types of inferences from semantic data, inferences of discrimination and inferences of similarity. In the former we connect a difference in linguistic reaction with a difference in extralinguistic reaction. In the latter we assume that situations similarly responded to linguistically are treated similarly from some other point of view.

B. Hypotheses of Discrimination

The most evident and frequently employed basis for drawing conclusions in this area is given by the fact that E.M.U.'s differ from language to language—indeed, are probably never identical in any two languages. It follows that different languages provide different defining characteristics for their elementary units in terms of the nonlinguistic

environment. An extreme conclusion that is sometimes drawn from this fact is that the speakers of a language are aware only of those distinctions which are provided by differences of meaning in E. M. U. 's. This was assumed, for instance, by some of the participants in the celebrated controversy regarding ancient Greek color perception, in which the absence of elementary terms for certain colors led to the conclusion that the Greeks were color-blind in these areas. An allied but opposite conclusion is that the presence of discrimination furnished by two or more different E. M. U. 's prevents the speaker from noting their similarities or common features, unless a general term exists in addition. Lévy-Bruhl constantly draws conclusions of this type from the languages of primitive peoples. For example, the Bororo of Brazil are said to be incapable of noting the features common to all parrots because they have names for individual species of parrots but no term for parrots in general. American writers have usually repudiated this extreme form of determinism (e.g., Hoijer 1953: 560-61).

The possibilities of correlation with E. M. U. distinctions would seem to be in the area rather of cultural behavior than of perception. The type of hypothesis which we are justified in proposing here takes the form of significantly more than chance correlation between the frequency of response to those stimuli in a situation which are defined by elementary meaning units, except linguisemes. In this formulation the emphasis is on frequency of the response, which implies habits common to a large number or all speakers of a language. Hence this can be said to constitute a correlation with cultural behavior. By stating such hypotheses in terms of frequency, we also avoid the assumption of total uniformity which leads to the type of linguistic determinism rejected above. Moreover, this is simply a rule for forming hypotheses. We do not state that such hypotheses are always, or even in general, true, although they may well turn out to be so. The classical area of investigation of hypotheses of this type in ethnology has been that of kinship. I believe that the general conclusion can be drawn from these studies that significantly better than chance correlation does exist in this particular instance.

Where such correlations hold, on a synchronic plane we note the congruence between linguistic and nonlinguistic behavior. The attempt to establish priority of the verbal or nonverbal aspect seems

to resemble the proverbial situation of the chicken and the egg. If we phrase the correspondence in terms of linguistic priority, we say that reactions are directed with more than chance frequency into certain habitual channels by language. Viewed historically, however, there is a greater plausibility in the notion that the stock of E. M. U. 's tends to adapt to nonlinguistic changes rather than that nonlinguistic aspects are adjustments to linguistic shifts. This is certainly true in technology but even in philosophy, science, and religion it seems likely that the appearance of new E. M. U. 's is chiefly a response to needs which have arisen at the particular point of development of the subject matter itself (See Boas 1911.) The phrase "tends to adapt" was employed above because there is sometimes a time-lag (in which case the linguistic survival aids us in historical reconstruction) or sometimes no adjustment takes place, the new situation being handled somewhat clumsily by a complex rather than elementary meaning unit (i. e., by a phrase, or the like).

A further fact is to be noted in regard to such correspondences. The existence of distinct E. M. U. 's makes us suspect a difference in response to the situations designated by the terms. It does not, in general, tell us the nature of this difference in response. For example the existence of separate unanalyzable terms for father's brother and mother's brother makes us posit a difference in reaction to these relatives. It does not tell us wherein the difference consists, whether, for example, the first is treated with deference but the second with familiarity. To discover this, we must observe behavior, both verbal and nonverbal, that is, what things are habitually said and done with reference to the father's brother and the mother's brother.

At this point it seems essential to point out a difference expressed here in the distinction between language and verbal behavior. It is parallel to the contrasts *langue* : *parole* (De Saussure), syntactic and semantic : pragmatic (Morris, Carnap), and code : message (information theorists), and seems to embody a necessary distinction. A complete knowledge of the language system, including the phonology, the semantics, and the grammar, cannot tell us a priori which of the indefinitely large number of possible sentences which can be constructed in accordance with the rules will actually be employed. This latter is verbal behavior.

If, however, a macroseme (i.e., an idiom) is employed, an attitude or value may sometimes be inferred. The conditions for drawing valid conclusions in these instances are discussed below in connection with inferences of similarity. An example is the macroseme cited by Hoijer as used in Apache by a man to designate his wife's relatives: kà'îšxéhé those for whom I carry burdens (1948: 337).

There are some instances in which hypotheses of connection between E. M. U. differences and differences of cultural behavior are particularly plausible. One example is where generic meanings, defined above as the meaning common to a specific group of E. M. U.'s, are involved. Here we often have to do with whole groups of terms in areas like numerals, kinship terms, etc., which involve a small number of generic meanings in varied combinations. In such cases, the probabilities of significant correlation with behavior increase because we have to do with meaning distinctions found in a whole group of terms. (See, e.g., Trier 1932.)

So-called compulsory categories are another case in point. These are instances where the rules of the language force us to choose one of a set of alternative meaning units. Actually there are degrees of compulsion. One extreme is that of compulsory morpheme classes which must appear in all or nearly all types of sentences (e.g., number in English, which is, however, not specified if the construction consists of a verb imperative without an object: "Sit quietly!"). On the other hand, a lesser degree of compulsion exists where a general term is absent and the meanings which refer to it are classified on one or more general bases. Thus, in Navaho, one cannot state motion in general but must choose among a number of terms specifying the vehicle involved and other aspects of the motion. Such a choice is less often required of us than in the case of number in English, since it only comes into play when we wish to describe motion. Instances of compulsion necessarily refer to choice among morphemes belonging to the same morpheme class, i.e., which are mutually substitutable. Where this holds, the hypothesis of correlation with cultural conduct becomes particularly plausible, as, e.g., in the case of Eskimo words for "snow" and Arabic words for "camel."

However, the frequency aspect of our hypothesis still holds.

There may well be particular instances where linguistically required bases of distinction are not relevant to the speaker's reaction. In the English sentence, "Anyone who owns a home must pay real estate taxes," as usually interpreted, number would be irrelevant, as is evident if we replace it with "Homeowners must pay real estate taxes," where the number of homes owned by each person is not specified. On the other hand, any aspect which receives compulsory expression in a language is likely to be one which is important in a large number of situations. It cannot be said, however, that these E. M. U.'s more than any other determine aspects of the speaker's conduct, since they can certainly be disregarded when not relevant to the situation, even where linguistically required. This linguistic requirement is sometimes phrased in a way that suggests determination of the speaker's conceptualization. This is a legitimate manner of speaking, if we realize that we are merely restating our linguistic facts in different terminology, since by concepts are meant the definitions of E. M. U.'s. If we then ask for evidence of these conceptualizations, we are led back in circular fashion to the linguistic facts as sole evidence.

The exclusion of *linguisemes* and *linguisememes* (linguistic meanings) from all hypotheses of discrimination, as stated in our definition, applies also to hypotheses of similarity. It will, therefore, receive separate discussion later.

C. Hypotheses of Similarity

In certain cases, language groups a number of meaning elements together, and we are therefore led to hypotheses connecting such facts with similarities in nonlinguistic behavior. These arise chiefly from two sets of linguistic phenomena, the relation of a *sememe* to its member *semes* and that of a *macrosememe* to its constituent *sememes* and *episememes*. An example of the former is the instance cited by Whorf where a watchman reacted carelessly in the presence of "empty" gas drums presumably because the *sememe* of "empty" in English has at least two *semes*, one being synonymous with "void" and the other with "not dangerous" (1952: 27). The *macrosememe*, by definition a construction in which the meaning of the constituents is not sufficient to predict the meaning of the whole, gives us two meanings, a literal and an idiomatic, which can lead to a hypothesis of similar reactions in the two situations. For example, a Hausa construction has the

literal meaning "companion in play" and the macrosememe "cross-cousin." From the equation of these two meanings one can arrive at the hypothesis that one plays with one's cross-cousin (i.e., has a "joking" relationship in the sense employed in the literature on social organization). This turns out to be correct.

Interpretations of similarity usually assume one meaning as basic and the other or others as metaphorical extension. It is then stated that the latter is evaluated or reacted to in terms of the former. For sememes the basic seme is usually selected on one or a combination of the following grounds: historical priority, frequency of use, closeness in meaning to that of an accepted grammatical term (e.g., Whorf 1952: 34), translation equivalence in the writer's own language, or centrality. A seme is said to exhibit centrality when most or all of the other semes of the same sememe can be derived from it by specialization or other metaphorical shifts. For the macrosememe, the literal meaning is always taken as basic.

Here again, as for the hypotheses of discrimination, what the linguist's material furnishes is hypotheses leading to the equation of certain situations. To discover whether they are responded to in similar fashion or identically, we must observe verbal and nonverbal behavior. For example, in the case of the Hausa phrase we must observe how such people behave to each other in word and in deed. Without such corroborative evidence, the conceptual equation becomes a mere tautologic restatement of the linguistic fact.

The study of behavior in reference to situations thus equated linguistically opens up the whole field of false beliefs which employ the facts of particular languages as premises, pointed to by the general semanticists. The extent to which such equations in behavior are made, even where inappropriate or definitely harmful, varies from society to society. At one extreme, semantic sophistication leads to their avoidance though perhaps never with complete success and under all circumstances. At the other end of the scale, certain societies with systematic doctrines of word magic have sought to draw as many such conclusions as possible and make them the object of belief. In investigation of all cases, however, the observation of behavior, both verbal and nonverbal, is necessary.

The situations discussed in this section arise historically in two ways, through metaphorical extension and accidental homonymy. Metaphorical extension results when someone sees a resemblance between one situation and another and this resemblance is generalized among the speakers of the language. For example, the "leg" of a table resembles that of a human being sufficiently in some respects so that a metaphorical extension was induced among speakers of English. False belief stems from metaphors or homonyms when propositions are believed in which one meaning (seme) is inappropriately substituted for the other. Nothing compels me to entertain such beliefs, but, when I do, the form which they take depends on the particular meanings in the language I speak. The case cited above of the watchman who behaved carelessly around "empty" cans may serve as an illustration. By equating two of the semes of "empty," he falsely entertained the proposition, "All void things are harmless." If he survived the explosion, he presumably ceased to believe this proposition.

The effects on behavior of such semantic equations may be viewed as varying along a continuum. As in the above example, they may constitute grounds for belief powerful enough to produce overt nonverbal behavior. At the other extreme, they may be quite ineffective or function merely as a suggestive stimulus to imagery not necessarily more vivid or more frequent than that which is unsupported by linguistic analogy. Indeed a faded metaphor of little vitality and without influence on the behavior of the speaker may appear very striking to the outside observer and be vested with undue significance. It is instructive, for example, that Weisgerber, who is, as we have seen, a prominent European exponent of the "linguistic Weltanschauung" point of view when it is a question of German, his own language, criticizes Bally for attaching too great an importance to certain idioms: "Mag Bally in dieser Hinsicht in manche dieser Beobachtungen vielleicht mehr hineinlegen als durchweg darin dem Sprachbewusstsein lebendig ist, . . ." (1950: 209). Because the sergeant barks at his men it does not follow that we feed him dog biscuits.

One of the grounds for selecting basic meaning enumerated above, translation meaning, deserves particular mention for its bearing on the problems discussed here. What is meant is the choice of an equivalent from another language, normally that of the writer,

as a basic seme for inferences of similarity. This is the process which underlies the uncritical use of literal translation frequently encountered in the literature. It can be seen that this procedure is quite arbitrary inasmuch as interpretation of the same data will differ, depending on the particular language employed for translation. We may take as an example Whorf's reasoning regarding the Hopi use of cardinal and ordinal numbers. Finding two sets of numerals in Hopi and two in English, Whorf equates one Hopi set with the English cardinals and the other with the English ordinals, making, it may be added, a justifiable choice on the basis of frequency of meaning correspondence. In those instances where Hopi employs the set which has been equated by translation to English ordinals for situations in which we use cardinals, the Hopi is said to view the situation ordinally, that is, in terms of our ordinals. Hence the use of the Hopi "ordinal" in phrases stating the number of days of duration leads Whorf to the conclusion that:

The count is by ordinals. This is not the pattern of counting a number of men or things, even though they appear successively, for even then they could gather into an assemblage. It is the pattern of counting successive appearances of the same man or thing, incapable of forming an assemblage. The analogy is not to behave about day-cyclicity as to several men ("several days"), which is what we tend to do, but to behave as to the successive visits of the same man [1952: 37].

Employing the same reasoning, a Frenchman who calls his kings Henri quatre (Henry four) and Louis treize (Louis thirteen) might draw the conclusion that English speakers who use the phrases "Henry the fourth" and "Louis the thirteenth" view each king of the same name as the same man appearing anew. He might even conjecture a belief in reincarnation of like-named kings. Further, a French observer might even be moved to conclusions similar to those entertained by Whorf for Hopi regarding the English conceptualization of time periods, by contrasting the French Juillet quatorze (July fourteen) with English "July fourteenth." On the other hand, the German metalinguist accustomed to Heinrich der vierte (Henry the fourth) and der vierzehnte Juli (the fourteenth July) would not have a basis for drawing conclusions similar to that of the French scientist concerning the English-speaking community.

D. Linguistic Meaning

It would now be generally agreed that meaning is to be understood functionally, i.e., that meaning is to be described in terms of a rule of use stated in terms of the environment. This environment is twofold, ethnic and linguistic. All meaningful elements can be defined in terms of linguistic contexts, this being the basis of the "content-analysis" approach of Zellig Harris. Most meanings can also be described by reference to the nonlinguistic environment, but, for a few sememes, some or all semes are solely linguistic in function (linguisesemes). By definition, such terms are not susceptible of semantic interpretation in terms of nonlinguistic environment. For example, if we wish to set up rules for the use of the morphemes marking the various noun-classes of the Bantu language, we operate for the most part in terms of linguistic context; i.e., most of them can be defined only by reference to an arbitrary subclass of noun root-morphemes, a class which shows grammatical significance in terms of adjective and pronominal agreement. Such linguisesemes have been excluded from the definitions of the previous sections for the simple reason that, if correlations with nonlinguistic phenomena could have been found, then it would not have been necessary to define the seme purely in terms of linguistic context. If correlations had been found, the semes would already have figured in our linguistic analyses as ethnosemes. The problem, then, is to discover under what circumstances ethnosemes, as opposed to linguisesemes, can be defined in linguistic investigation. We cannot a priori decide that situations which in our culture are marked by no common denominator of behavior might not have one in some other culture. Our evidence then must come from ethnographic observation of the conduct of the speakers to see if such elements can be defined in terms of behavior of the speakers.

Let us take as an example the Central Algonquian division of nouns into two classes which we will call, neutrally, I and II. Class I has singular -a, plural -aki (Bloomfield 1946: 94). Class II has singular -i, plural -ali, and there are other differences relating to pronominal reference. If we wish to specify the total meaning of the morphemes -a, -aki (outside of the ethnosemes of number), we must take the following facts into consideration. Members of Class I include persons, animals, spirits and large trees, tobacco, maize, apple, raspberry (but not strawberry), calf of the leg (but not the thigh),

stomach, spittle, feather, bird's tail, horn, kettle, pipe for smoking, snowshoe, and a few others. The classification "animate" covers a large part of this class, but what of the rest? Unless the actual behavior of Algonquian speakers shows some mode of conduct common to all these instances such that, given this information, we could predict the membership of Class I, we must resort to purely linguistic characterization. If it turned out, for example, that speakers of Algonquian have a shrine to the raspberry and treat it like a spirit, while the strawberry is in the sphere of the profane, and if similar facts could be adduced regarding the other terms, then a definition of Class I affixes would be possible by reference to the nonlinguistic behavior of Algonquian speakers. I do not believe that the ethnographic facts about these peoples will allow of such a definition. Since all persons and animals are in Class I, we have at least one ethnoseme, but most of the other meanings can be defined only by a linguiseme.

Tautologic statements of similarity based on a valid ethnoseme, usually described by a grammatical label, are sometimes made. If, for example, we call I "animate" and II "inanimate," then the statement that the Central Algonquians conceive of kettles as animate is merely a tautologic statement of the grammatical fact.

III. Inferences from Structure

By structure is meant here facts about a language stated as an abstract calculus without reference to meaning. If, for example, it is stated in regard to a particular language that no morpheme contains more than six phonemes, this is a structural fact. Inferences from structure like those from phonology, the other nonsemantic aspect of language, are of two kinds, mediated and unmediated. The linguistic typologies popular in the nineteenth century, isolating—agglutinative—inflective and the like, involved chiefly structural criteria, for example, the degree of morphemic complexity of the word. The application was mediated through a supposed connection with the evolution of thought from lower unorganized (isolating) forms to higher synthesized (inflective) forms. M. Mueller even connected these at one time with economic stages of development. For a recent example of purely structural criteria, applied in unmediated form, we may cite those adduced by

Lévi-Strauss in correlation with social structure. Regarding Indo-European languages he says, "The languages have simple structures utilizing numerous elements. The opposition between the simplicity of the structure and multiplicity of elements is expressed by the fact that several elements compete to occupy the same position in the structure" (1951: 161). I am not quite certain how to interpret this, but it is certainly a structural statement. Many apparently structural criteria turn out to be actually semantic when more closely investigated. A favorite type of inference from structure is interpretation by similarity involving the constituent episemes of an episememe (meaning of a construction), for example, statements that a certain situation is viewed actively rather than passively on the assumption of a basic actor-action episeme.

IV. Conclusion

The object of this paper has been to analyze the conditions under which, in the author's opinion, inferences from linguistic to non-linguistic data can be legitimately made. It has not been within its scope to analyze attempts such as those of Whorf (Hopi), Hoiyer, Astrov, Kluckhohn (Navaho), Lee (Wintun, Trobriands), Jespersen (English), Bally (French and German), and Weisgerber (German) to isolate large-scale linguistic patterns and relate them to dominant modes of behavior and thought. While no such analysis is, therefore, attempted, the implications of certain of the conclusions of the present paper for these wider problems may be pointed out.

It is apparent that the conditions of valid inference described in the present paper allow no more than a better than chance predictability from certain semantic facts to certain particular judgments of similar and differential reactions to situations. Such scattered beliefs and behavior differentials can hardly be expected to add up to anything as coherent as a world view. Is it possible, then, to justify statements such as the following of Whorf that "the Hopi language and culture conceal a METAPHYSICS such as our so-called naive view of space and time does, or the relativity theory does, yet a different metaphysic from either" (1952: 47)?

A basic difficulty stems from the fact that in ordinary use the term "metaphysics" refers to a set of beliefs which take sentential form. But language only gives us the meanings of elementary units together with the rules of construction for making sentences from them. From the finite set of elements and rules it is impossible to predict which of an infinitude of sentences will actually be used by the members of a speech community. It is not easy to see, therefore, how we can infer any such formulations of belief.

In view of this difficulty we might wish to limit our metaphysics to one of terms, rather than one of propositions, and state that a particular manner of viewing the universe is implicit in the organization of the individual meaning elements of a language—what might be termed its semantic structure. Though this is a possible procedure, it requires an ascetic regimen to which none of the writers on this subject has, in fact, conformed. Given the difficulties already mentioned in the way of using phonological and structural criteria, the enterprise resolves itself into the attempt to find semantic orderings, particularly generic meanings or similar meanings in diverse morpheme and constructional classes. What we do find in languages are partial orderings in certain areas where the data themselves demand such systematization in order to be dealt with by the speakers. Typical instances are kinship systems, numeral systems, color terms and directional-spatial terms. But these are so different in subject matter that attempts at finding common denominators for such diverse semantic aspects are likely to seem vague and arbitrary. Thus Whorf assimilates under a common rubric of "objective world-view" the English verb tenses and the meaning of the container formula in such phrases as "two pounds of butter," but it is difficult to see on the basis of any of the various uses of the term "objective" (e.g., existing independent of the observer, outside the organism, intersubjective) how the two sets of meanings can be linked. Why, for example, are tenses more objective than aspects? It is interesting to note in this connection that Speiser takes the opposite point of view in regard to Semitic. "The Akkadian system is objective and impersonal, the verb thus assuming a stative character The West Semitic system, on the other hand, bears a personal and subjective character which imparts to the verb a temporal orientation" (1938: 198).

These difficulties are, I believe, not accidental but inherent

in the problem. Since natural language is not devised by philosophers but develops as a living instrument of a community in its adjustment to a variety of changing needs, one would not expect and, in my experience at least, one does not find any underlying semantic patterns such as would be required for the semantic system of a language to reflect some over-all world view of a metaphysical nature.

The subject seems to me by all means worthy of further investigation, but, if the points raised in this paper are valid, numerous methodological obstacles remain to be overcome. Should such attempts prove in the long run not to be feasible, the more modest specific correlations between linguistic and nonlinguistic cultural behavior which remain are still of immense value toward the understanding of the past and present life of a people.

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4

The Measurement of Linguistic Diversity

1. The examination of any map of linguistic distributions for an extended area will show some regions of great diversity (e.g. New Guinea, the Nuba Hills in the Anglo-Egyptian Sudan) and others of relative uniformity (e.g. the aboriginal Eastern Woodlands area of North America, the contemporary United States), while still others seem to be intermediate between these extremes. The problem considered here is that of developing quantitative measures of this diversity in order to render such impressions more objective, allow the comparing of disparate geographical areas, and eventually to correlate varying degrees of linguistic diversity with political, economic, geographic, historic, and other nonlinguistic factors.

2. The simplest model, which for reasons soon to be apparent is called the MONOLINGUAL NONWEIGHTED METHOD and is referred to as method A, may be described as follows. If from a given area we choose two members of the population at random, the probability that these two individuals speak the same language can be considered a measure of its linguistic diversity. If everyone speaks the same language, the probability that two such individuals speak the same language is obviously 1, or certainty. If each individual speaks a different language, the probability is zero. Since we are measuring diversity rather than uniformity, this measure may be subtracted from 1, so that our index will vary from 0, indicating the least diversity, to 1, indicating the greatest.

The total probability of choosing two speakers of the same language is the sum of the probabilities of such an event for each individual language \underline{M} , \underline{N} , \underline{O} , For each of these in turn the probability is \underline{m}^2 , \underline{n}^2 , \underline{o}^2 , . . . , where \underline{m} is the proportion of speakers

of \underline{M} to the total population, \underline{n} that of \underline{N} , etc. Subtracting from 1 as suggested above, the formula becomes 1 minus the sum of these squares, or

$$(1) \quad \underline{A} = 1 - \sum_i (i^2)$$

where \underline{A} is the measure and i successively takes on the values \underline{m} , \underline{n} , \underline{o} , etc. This may be illustrated by a simple hypothetical example. If in a population $1/8$ speak \underline{M} , $3/8$ speak \underline{N} , and $1/2$ speak \underline{O} , then $\underline{A} = 1 - \{(1/8)^2 + (3/8)^2 + (1/2)^2\} = 1 - \frac{26}{64} = \frac{38}{64}$, or .593 . . .

3. Two considerations suggest a more complex model than the foregoing, one in which the degree of resemblance among the languages is taken into consideration. First, with the same proportional distribution among the languages, we wish to call an area more diverse if a number of unrelated or distantly related languages are spoken there than one in which the languages are closely related descendants of the same original language. Secondly, in the absence of a rigorous definition of language as opposed to dialect, results from different areas may not be strictly comparable where decisions are made on conventional lines, as they will be if based on the usual types of census. These factors suggest the following modification of the procedure of the preceding section, leading to the MONOLINGUAL WEIGHTED METHOD, here symbolized by \underline{B} . For each pair of languages (\underline{M} , \underline{N}) the probability of choosing successively a speaker of \underline{M} and a speaker of \underline{N} is the product \underline{mn} , where \underline{m} and \underline{n} respectively designate the proportion of \underline{M} speakers and \underline{N} speakers to the total population. Each such product is weighted by multiplication with a number between 0 and 1, here called the resemblance factor (r), obtainable as follows. Using an arbitrary but fixed basic vocabulary, e.g. the most recent version of the glottochronology list, the proportion of resemblances between each pair of languages to the total list is given as a fraction. Since we are measuring actual resemblance, not historic relationship, it is suggested that both cognates and loans be included as resemblances. Then the sum of such weighted products subtracted from 1 will give the monolingual weighted index \underline{B} :

$$(2) \quad \underline{B} = 1 - \sum_{\underline{mn}} (\underline{mn}) (r_{\underline{MN}})$$

where $r_{\underline{MN}}$ is the measure of resemblance between languages \underline{M} and \underline{N} as just defined. In fact, method \underline{A} can be considered a special case of \underline{B} , in which by all-or-none decision each product is multiplied by 1 when the \underline{m} and \underline{n} are the same, and by 0 when they are different. Thus, in the first example, $\underline{A} = 1 - [1 \times \{ (1/8)^2 + (3/8)^2 + (1/2)^2 \} + 0 \times \{ (1/8 \times 3/8) + (1/8 \times 1/2) + (3/8 \times 1/8) + (3/8 \times 1/2) + (1/2 \times 1/8) + (1/2 \times 3/8) \}]$.

The calculation of \underline{B} can be illustrated by elaborating this example. Keeping the same population distribution of \underline{M} , \underline{N} , and \underline{O} , let us consider as additional data resemblances of 0.85 between \underline{M} and \underline{N} , 0.30 between \underline{M} and \underline{O} , and 0.25 between \underline{N} and \underline{O} . Then $\underline{B} = 1 - [(1/64 \times 1) + (3/64 \times .85) + (1/16 \times .30) + (3/64 \times .85) + (9/64 \times 1) + (3/16 \times .25) + (1/16 \times .30) + (3/16 \times .25) + (1/4 \times 1)] = .381$.

The value of \underline{B} is obviously always less than or equal to \underline{A} , and only equal to \underline{A} when the measure of resemblance among all pairs of languages is zero. If we were to call two forms of speech with a resemblance of 1.00 distinct languages, the result would be the same as if we had called them the same language. As an incidental result, this procedure gives us a definition of a language as forms of speech with 100% resemblance in basic vocabulary—a definition not necessarily recommended in other contexts. If the nonweighted method \underline{A} is to be used, it will be useful to obviate the usual vagueness of the term 'language' by defining 'same language' in this manner, or by a smaller minimum of resemblance applied consistently, say 0.95 rather than 1.00.

4. Our general expectation, subject to significant qualifications, is that areas of high linguistic diversity will be those in which communication is poor, and that the increase of communication that goes with greater economic productivity and more extensive political organization will lead typically to the spread of a lingua franca, whether indigenous or imported, resulting in widespread bilingualism and the ultimate disappearance of all except a single dominant language. Measurements of language diversity may therefore be expected to show significant correlations with economic levels and with degrees of acculturation. In order to accomplish this, however, facts of polylingualism need to be taken into account.

The indices A and B are called monolingual in that each individual is counted as a speaker of a single language, his dominant one. In this section a number of measures are described which include data concerning polylingualism. A simple procedure which suggests itself is to count every speaker of two languages as two people, every trilingual as three, and so on. This method may be called the SPLIT-PERSONALITY METHOD, and in its nonweighted and weighted versions it will be designated as C and D respectively. A procedure perhaps logically more satisfying is the RANDOM SPEAKER METHOD, again with variants nonweighted and weighted for interlinguistic resemblance. This method is based on the following probability procedure. Suppose that an individual is chosen from the population at random and that, if polylingual, it is equally probable that he will speak any one of the languages which he commands. Let a second speaker then be chosen in the same fashion. Then the probability of their speaking the same language is index E, and the probable measure of resemblance among their languages is index F. For a totally monolingual population, E will give the same results as A, and F the same results as B. The general procedure is the same as that for A and B respectively. However, the population is now divided into proportions of speakers of any one language only or any particular combination of languages. Thus a population speaking M, N, and O might be divided into $\underline{m} = 1/8$, speakers of M only; $\underline{n} = 3/8$, speakers of N only; $\underline{o} = 1/16$, speakers of O only; $\underline{mn} = 1/4$, bilingual speakers of both M and N; $\underline{mo} = 0$, bilingual speakers of M and O; $\underline{no} = 3/16$, bilingual speakers of N and O; and $\underline{mno} = 1/16$, trilingual speakers of M, N, and O. Their sum is necessarily 1, the entire population. Each product of two of these proportions is calculated as before. In this case there are 49 including those of zero value. Thus $\underline{mn} \times \underline{mno} = 1/4 \times 1/16 = 1/64$, the probability of first picking a bilingual speaker of M and N and then a trilingual speaker of M, N, and O. Each of these products is then divided into as many parts as the product of the number of languages in each group. Thus the value of $\underline{mn} \times \underline{mno}$ in the foregoing example is divided into six equal parts corresponding to the language combinations MM, MN, MO, NM, NN, and NO. In method E each of these values is multiplied by 1 if for an identical pair (MM, NN) and by 0 for diverse pairs (MN, MO, NM, and NO). In the foregoing example where $\underline{mn} \times \underline{mno} = 1/4 \times 1/16 = 1/64$, 1/64 is divided into 6 parts, each with the value 1/384, of which two are multiplied by 1 and four by 0, with the end result of $1/64 \times 1/3 = 1/192$. For method F, each

of these six parts is multiplied by the resemblance index of the corresponding pair of languages. As before, all these values are summed and subtracted from one.

A further method (G) is the RANDOM SPEAKER-HEARER METHOD. This is the probability that if one individual is chosen at random from the population who, if polylingual, is equally likely to speak any of his languages, then a second member of the population will be able to understand him; that is, that the language of the first speaker will be one of those that the second speaker knows. This method, by a decrease in the diversity index, will reflect more strongly the actual spread of a lingua franca. Only one version, the unweighted, is practicable with this method. The procedure is the same as that for method E, except that when products of the proportions of polylingual speakers are split, each fraction is multiplied by 1, either where the value corresponds to the pairing of identical languages or where its second member occurs as any first member of a pair. Thus, in the example of the previous paragraph, the fractions corresponding to MM, MN, NM, and NN are all multiplied by 1, and only NO and MO by 0, resulting in a value of $1/64 \times 2/3 = 1/96$ rather than $1/192$ as in method E.

A final suggested measure, H, is the INDEX OF COMMUNICATION. This is the probability that if two members of the population are chosen at random, they will have at least one language in common. This measure then indicates the actual possibility of communication among any two people taken at random. As such it is the most responsive of all to such phenomena as the spread of auxiliary languages. This measure is obtained by first dividing the population into proportions of speakers of any one language only or any particular combination of languages and then calculating the products of each pair of such proportions as in method E. Then each such proportion is multiplied by 1 if there is at least one common language among the languages corresponding to each factor in the product. Thus, if in a population $1/20$ are trilingual in MNO and $1/20$ are bilingual in OP, the product $1/400$ is multiplied by 1. The sums of these products is then obtained. In this case, it seems advisable not to subtract from 1: if we did, we would have an index of noncommunication.

Communication and language uniformity, the opposite of diversity and measurable by subtracting indices of diversity from 1, are

not equivalent concepts. There may be considerable diversity with a communication index of 1.00, indicating that all members of the population have one language in common.

It is also to be noted that in the measures involving polylingualism described here, no account is taken of an individual's relative command of the several languages he knows. Satisfactory measures have not as yet been developed, and, if developed, could hardly be applied on a scale which would allow them to be ascertained for an entire population. On the other hand, ranking as first language—usually the mother language as opposed to others—is possible, and is even found in some census reports; but there does not seem to be any unarbitrary way of giving this fact mathematical expression.

The effecting of increasing communication as reflected in each of the six indices which involve polylingualism is illustrated for a hypotheticalal case in Table 1. In I, five languages, M, N, O, P, and Q, are spoken monolingually, each by 1/5 of the population, and each language has a resemblance of .50 to every other. In II, one of the languages, M, has spread to one-half of the speakers of every other language, so that 1/5 speak M only, 1/10 each are MN, MO, MP, and MQ bilinguals, and 1/10 each are non-M monolinguals. In III, M has spread to the entire population, all of whom are now bilinguals except the original speakers of M. In IV, there is a universal lingua franca, unrelated to any of the languages in the area; here 1/5 each of the speakers are MR, NR, OR, PR, and QR bilinguals, when R has a resemblance of .00 to each of the others and, as before, M, N, O, P, and Q have a resemblance of .50 to each other. As explained above, C indicates the split-personality unweighted method, D the split-personality weighted method, E the random speaker unweighted method, F the random speaker weighted method, G the random speaker-hearer method, and H the communication index.

TABLE 1

	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
I	.80	.40	.80	.40	.80	.20
II	.83	.37	.75	.365	.66	.48
III	.64	.31	.60	.30	.40	1.00
IV	.70	.50	.70	.60	.40	1.00

5. The methods just outlined have the considerable advantage that, since the proportions of population speaking a particular language or combination of languages are the basic data, the areas and populations compared may be of any extent. It is then left to the good sense of the investigator, taking into account the particular nature of the problem in which he is engaged, to specify the regions that he wishes to compare. Normally one would expect that these will be of at least roughly similar size and population. Thus it does not seem likely that the linguistic diversity of the Cape Verde Islands could with profit be compared to that of Asia as a whole. The practical exigencies flowing from the fact that census data are always compiled with reference to established political units will, however, normally preclude the comparison of regions which are identical either in size or in population.

The question therefore arises whether a mathematical corrective factor can take this into account. In general, diversity should increase with increase in area. It can be shown that if the diversities of \underline{X} and \underline{Y} are measured separately, the diversity of the combined area $\underline{X} + \underline{Y}$ may be greater than that of both component areas or greater than one but not the other. It will be equal to \underline{X} and \underline{Y} only if, besides having equal diversities, \underline{X} and \underline{Y} also contain the same languages distributed in the same proportions. The combined diversity can never be less than the diversity of EVERY component area.

This can be illustrated from the results of Table 2. Mexico as a whole has an index of monolingual unweighted diversity \underline{A} greater than 20 and less than only 12 of the 32 constituent provinces. The communication index \underline{H} for Mexico as a whole is smaller than for 23 of its provinces and higher than for 9. Even more strikingly, the Caucasus as a whole shows for index \underline{A} a diversity greater than 6 of its 7 constituent areas, and little less than that of Daghestan, by far its most diverse subarea.

It would seem natural in comparing two areas \underline{X} and \underline{Y} , where \underline{Y} is larger than \underline{X} , to expect \underline{Y} to show a diversity equal to that of a combined area consisting of \underline{X} and an increment equal to $\underline{Y} - \underline{X}$, where the diversity of \underline{X} and $\underline{Y} - \underline{X}$ is the same. As we have seen, however, the diversity of a combined area is not determined by the diversity of

its components. Even if they are equal in diversity, the diversity of the combined area will depend on which languages in one subarea recur in the other, and no unarbitrary hypothesis here seems possible. The problem is therefore left unsolved for the present.

6. The distinctness of the communication potential as measured by index \underline{H} , from the degree of linguistic unity as measured by any of the diversity indices subtracted from 1, was noted above in passing. It is also well to distinguish what is measured by unweighted and by weighted indices of diversity. An isolated area of primitive agriculture might well show a similar unweighted diversity index to that of an industrialized area where there has been recent and varied migration from distant regions. However, the indices weighted for language resemblance would probably indicate greater diversity for the industrialized area. This example also suggests that while in general we may expect greater linguistic diversity to correspond to poorer communication and a lower level of production, the relation is by no means a simple one. Thus the extension of communication in a hitherto isolated area may have as its first result an increase in all diversity indices.

The relation of various measures of diversity to extralinguistic factors is primarily a problem in sociology and anthropology, which is not discussed here further. The ultimate goal may be a typology of linguistic areas, in which areas with similar values for all the indices are marked by similar ecological, economic, and political conditions.

TABLE 2

	\underline{A}	\underline{H}
Aguas Calientes	.0016	.9997
Baja California Nord	.3893	.9434
Baja California Sur	.0315	.9999
Calima	.0140	1.0000
Campeche	.4997	.7042
Coahuila	.0324	.9998
Chihuahua	.1955	.9112
Distrito Federal	.1295	.9994
Durango	.0404	.9862

Guanajuato	.0152	.9992
Guerrero	.3655	.7371
Hidalgo	.5060	.6665
Jalisco	.0141	1.0000
Mexico, Estado de	.3763	.8635
Michoacan	.1189	.9624
Morelos	.2476	.9949
Nayarit	.0720	.9588
Nuevo Leon	.0288	.9978
Oaxaca	.8363	.4767
Puebla	.5922	.7043
Queretaro	.1665	.9469
Quintana Roo	.5508	.7448
San Luis Potosi	.3357	.8610
Sinaloa	.0618	.9950
Sonora	.2226	.9577
Tabasco	.1871	.9588
Tamaulipas	.0570	.9988
Tlaxcala	.3104	.8982
Vera Cruz	.3465	.8175
Yucatan	.4056	.6824
Zacatecas	.0002	.9998
Mexico	.3122	.8386
Georgia	.6370	
Armenia	.2740	
Azerbaijan	.6105	
Daghestan	.8988	
Chechen	.1161	
Northern Ossete	.2736	
Karachai	.3252	
Caucasus	.8703	
Plateau Province (Northern Nigeria)	.9539	

7. A number of indices are calculated in Table 2, in order to illustrate some of the results that may be obtained from the method:

just discussed. Indices A and H, the unweighted monolingual and the communication index respectively, are calculated for all the states of Mexico and for Mexico as a whole on the basis of the 1930 census; one reason for the choice was the existence in this census of statistics on bilingualism. Weighted indices were not calculated because of the labor involved, as well as the incompleteness of the linguistic information. Next are shown results for index A from seven territories in the Caucasus, together with combined statistics for the whole region, based on the 1926 census. Finally, index A has been calculated for the Plateau Province of Northern Nigeria, British West Africa, based on the figures in C. G. Ames, Gazetteer of the Plateau Province, Nigeria (Jos, 1932). This is an area noted for its linguistic diversity; index A turns out to be higher than the corresponding values for Daghestan or Oaxaca, both also notable in this regard.

In the present and the subsequent two chapters * only one of the many ways in which the science of language is related to other sciences dealing with cultural behavior will be systematically considered. The group of problems selected may be described as the interpretation and evaluation of various theories of culture in the light of the data provided by language. This particular facet of what may be broadly termed "ethnolinguistics" has apparently been little considered up to now. It is a generally accepted thesis that language is a part of the cultural behavior of peoples. Linguistics is thus logically a branch of cultural anthropology, the general science which is concerned with such behavior. However, linguistics has existed in addition to this affiliation and continues to flourish outside anthropology in the general academic division of labor and is the heir of concepts and theories independently derived and often antedating those of anthropology as a whole. The inevitable result of such historically conditioned disparity is that the application of cultural theories, usually conceived without any, or with only minor, reference to language, requires as a preliminary the interpretation of such terminology into the traditional frame of reference employed in linguistics. This in itself has an intrinsic value as a step toward the unification of terminology within anthropology. More important, it allows us to employ linguistic data as a test of theories of culture. One putative advantage to be gained from the analysis of language often adduced by anthropologists is its transparency. But granting the truth of this observation, the transparency of the data will be of no avail if the terminology in which it is traditionally described

*"Language, Diffusion, and Migration" and "Structure and Function in Language" in Essays in Linguistics by Joseph H. Greenberg. Chicago, Illinois: The University of Chicago Press, 1957.

is such as to mask its relevance for cultural theory. The present essays do not claim to be more than a modest beginning of this complex and frequently difficult task.

The concept of evolution is one of wide significance, as is evident from its central role in certain philosophical systems and from the breadth of its applications in a variety of disciplines ranging from the natural and biological sciences (cosmic, terrestrial, and animal evolution) to the social sciences and humanities, particularly cultural anthropology and history. A concept of such far-flung uses necessarily differs much in individual instances, so much so that at times it seems difficult to discover the common elements underlying the diversity of applications. Several prevalent uses of the term "evolution" may be eliminated at the outset as inappropriate. One instance is the use of the term to mean orderly change in general. In this sense the existence of evolutionary phenomena is simply an affirmation of the basic scientific faith that the universe is ordered and coherent and therefore susceptible to the explanatory methods of science. If this is what is indicated by "evolution," no scientist, at least, is likely to disagree. It is evident, however, that something at once more distinctive and more controversial is usually indicated by the term.

Another meaning, which may be rejected, on the contrary ground of overspecificity, is that of "gradual" as opposed to "revolutionary" or sudden change. This usage is pretty much confined to sociology and political science. In these realms the existence of both types of social change is admitted as a fact. By some stretching of terminology, perhaps the term "revolutionary" might also be extended to the catastrophic changes in geology assumed by the advocates of the early Neptunian and Vulcanian theories. The concept of gradual, as opposed to violent, change seems too narrow to constitute the basis of a general concept of evolution. Still, both coherence and gradualness do play a certain role in the more generally applicable formulations of evolutionary theory to be outlined here.

Perhaps we may come closer to the essential ideas underlying all evolutionary approaches by considering that in every case

we have to do with the explanation of how a variety of forms, whether biological species, languages, or cultural systems, came to be. Two general types of explanation exist which we may call the "creationist" and the "transformist." The former, with sporadic exceptions, held the field until the turn of the nineteenth century. In its purest version it assumes that all kinds are unchangeable, except for more or less haphazard modifications within the bounds of the type, and have existed in their present form since they came into being by a single act of creation. Such was the generally accepted view regarding biological species before Darwin, and such likewise was the traditional Tower of Babel explanation of the origin of language diversity.

The opposite view is that all existing forms are historically connected by a dynamic process of growth. On this view, the greater the similarity among existing forms, the more recent the common ancestry. But, whether less remotely or more remotely, all forms are ultimately connected by descent. As a further consequence, common ancestors are forms different from any existing today and are conceived to be such as to give rise to present forms by differential independent development. Such growth is viewed as, in general, gradual and coherent, allowing for minor leaps, such as those induced by mutations in biology. Were changes sudden and capricious, anything might issue from anything at a not too distant remove, and the observed natural groupings of species would not occur. The employment of the term "evolution" exclusively for gradual change or coherence in change mentioned earlier is implied by these considerations.

In fact, creationism and transformism in their pure forms are polar concepts between which gradations are possible. On an extreme transformist view, all forms are related by ultimate common origin. There must therefore be some single primeval form from which all others developed. Monogenesis is therefore logically required. It would be possible to maintain a more moderate transformism in which each existing form is connected with at least some others but not with all, as a consequence of several distinct creations. Biologists who postulate connecting forms among some of the phyla for which plausible common ancestry cannot at present be found

are espousing the monogenist version of transformism. It is clearly possible to assume, with polygenists, several creations where links cannot be found and still deny that species are fixed types. Another intermediate view is that adopted by most geologists for a time in the nineteenth century to account for fossils. The belief was rejected that existing species are the unchanged continuations of the species created at the beginning while the fixity of species was maintained. From time to time all species were supposed to have been destroyed and new ones created without affiliation by descent from the forms of the previous era. In this fashion the basic notion of fixity of kinds could be maintained. This approach may be termed "catastrophism." There are thus four basic types of explanation of specific diversity: the evolutionary monogenetic, the evolutionary polygenetic, the creationist, and the catastrophic. The first and third assume single creations, the second and fourth, multiple creations; the first and second, transformation of species, the third and fourth, fixity of species.

In the sense of transformism, whether monogenetic or polygenetic, evolution was an accepted theory in linguistics earlier than in biology, though not under that name. The recognition that the resemblance of certain languages to one another is to be explained by common descent is the fundamental hypothesis underlying the concept of genetic relationship among languages. In Semitic studies for one, such theories were already held in the eighteenth century. The recognition of the Indo-European family at the turn of the nineteenth century is the single event which marks most clearly the birth of modern linguistic science. The evidence at that time led, as it still leads, to a polygenetic theory, since not all languages can be demonstrated to have a common origin. But, as in biology, the assumption of a similar process of differentiation for an earlier period and the absence of any proof of spontaneous generation in historic times lend plausibility to the speculation of monogenesis. Some day the problem may well be solved by the indirect evidence of anthropology, psychology, and general linguistic science.

The essential likeness between genetic theories in language and the evolutionary hypothesis in biology was explicitly recognized by Schleicher, a leading linguist of the nineteenth century. In his

work Die Darwinsche Theorie und die Sprachwissenschaft, he treats evolutionary theory in biology as, in principle, the equivalent of the genetic model of linguistic relationship.¹ In this, the transformationist sense, then, language may be said to evolve, and the recognition of the fact in linguistic science preceded its general acceptance in biology.

But a further idea seems to be required by the term "evolution" in its most generally accepted sense. A theory, for example, which regarded all species as interconnected but which posited some mammalian form as the primeval ancestral type, whence descended in one line all the other vertebrates, in another the ancestor of all non-vertebrate phyla, with Protozoa first appearing in a very recent period, would not be adjudged a representative evolutionary theory. In addition to the notion of transformation, another—that of progress or advance of some kind—is evidently required. Before examining further this idea of progress, its logical distinctness from transformism should be noted. For example, a holder of the catastrophic theory may well believe that each successive creation represents progress over previous ones. In fact, geologists in general accepted progress while denying transformation of species for a considerable period during the nineteenth century. It is well at the outset also to distinguish the fact of evolutionary advance, if it should turn out to be possible to characterize it in some objective fashion, from the ethical judgment that this advance is good which often accompanies it and tends to be the motivation for accepting its validity. The judgment that evolutionary advance exists and is good I shall call "progress." The fact itself I shall call "advance" or "evolutionary advance." The belief in evolutionary advance is compounded of the belief in some scale on which species or kinds can be rated as more or less advanced and the belief that, on the whole, less advanced forms have preceded more advanced forms in time.

In what way, for example, can man be said to be more advanced than an amoeba (N. B., not better)? The classic definition of Spencer states this difference in terms of heterogeneity and complexity as characteristic of advanced forms. But it is not heterogeneity or complexity as such which constitutes advance on the usual view. For example, the simplification of the toes of

the horse to form the hoof, which resulted in more efficient running, would be considered evolutionary advance. The single comprehensive law of Newton is an advance over Kepler's three laws of motion. In general, in the words of Herrick, it is "change in the direction of and increase in the range and variety of adjustments to environment" which is involved.² Among developments that may be considered as advance, there are, on the perceptual side, ability to respond to finer discriminations of stimuli, to stimuli from a greater distance, and to new ranges of stimuli, e.g., a new sense. On the motor or effector side the ability to live in a greater range of temperature, moisture, or other physical conditions of environment, speed of movement, and the ability to make finer manipulatory adjustments of objects in the environment may be cited as examples. In the intervening activity between perception and response comes the co-ordination of responses and the lesser or greater appropriateness of responses to stimuli, e.g., the development of a central nervous system, of social co-operation, and of intelligence in general.

This gives us many facets of comparison. Most, or perhaps even all, are, in principle, subject to objective comparative, even quantitative, evaluation. For example, we can measure speed of muscular response by reaction time, speed of locomotion in feet per minute, etc. Still, judgments on these varied scales may well show that, of two species, one is more advanced in some respect, one in another. This is what leads some biologists to say that each species is a perfect adaptation in its own way. Yet undoubtedly, on an over-all basis, man is more advanced than the amoeba; many similar judgments can be made. Moreover, it is a reasonable expectation, borne out by the paleontological record, that, on the whole, less advanced have preceded more advanced species. This might well be expected, for fineness of perceptual discrimination, the development of new organs of sense, the genesis and expansion of a central nervous system, the differentiation of specialized motor organs, all require time. Some correlation with the aforementioned criteria of Spencer—heterogeneity and complexity—may therefore be expected. For enhanced discrimination in perception and response, it can be argued, requires increased specialization of parts and increased complexity of organization of the whole and of each of the constituent organs. Still, complexity

is merely an incidental, however frequent, accompaniment of some aspect of efficiency.

If we now turn to language with these considerations in mind, we note that the typical nineteenth-century evolutionary theory of language which established the framework of all subsequent discussion was one which assumed complexity as the sole criterion of evolutionary advance in language, and only one aspect of complexity—morphological complexity—at that. For the nineteenth-century theory, in the standard formulation of Schleicher, set up three stages: isolating, agglutinative, and inflective, each of which was defined basically in terms of the morphological structure of the word. In contemporary terminology an isolating language is one in which each word consists of a single morpheme. In the agglutinative stage, words are multimorphemic, but there are, ideally, no irregular morphophonemic alternations. With inflecting languages, there are irregular alternations such that, in principle, the assignment of certain phonemes to one or the other of two morphemes is arbitrary. This is sometimes called "fusion." The line of evolutionary advance, then, is from isolating languages, characterized by the simplest word structure, through the agglutinative to the inflectional stage, marked by the most complex types of formation. This was alternatively characterized as an advance from analytic to synthetic forms of thought or from formless to true form languages.

The ethnocentrism, lack of rigor, and absence of correspondence of these stages with those derivable from non-linguistic culture all led to the general abandonment of the theory. As examples of non-correlation with general cultural evolution, we may note that the isolating, or most primitive, stage had as its most typical representative Chinese; that various American Indian languages turned out to have a more complex word structure than the Indo-European languages; and that in historic times Indo-European languages seemed to be changing from a synthetic to a more analytic or isolating type, a retrograde movement from the viewpoint of the standard theory.

In subsequent discussion it has usually been held that

language does not evolve, since there is no correlation between morphological complexity and economic or other criteria of evolutionary advances. This position is assumed even by writers with a predominantly evolutionary approach.³ A few writers, notably Jespersen, reverse the classical theory. The more primitive a language, the more complex according to their view, and evolutionary advances are marked by increasing simplification. Jespersen has, practically alone, considered seriously the problem of efficiency in language.⁴ He believes that the greater morphological simplicity of modern European languages, as compared to older forms in the same area, is an advantage and that the general movement of language is in the direction of such simplification. The weakness of Jespersen's treatment is that he has practically confined his interest to Indo-European languages. What is probably an internally conditioned drift toward morphological simplification has therefore been mistaken for a universal linguistic trend. An objective survey fails to disclose any decisive correlation between morphological complexity and the usual criteria of cultural evolution.

From this discussion it is evident that the subject of evolution of language has been treated almost solely in the context of morphological simplicity and complexity. But morphology is only one of the aspects of language. Simplicity in morphology might, for example, be accompanied by great semantic complexity, the presence, as in English, of numerous phrase idioms, of homonyms, and of multiple meanings of the same morpheme (ambiguity). The significance of morphological simplicity or complexity in the over-all picture of language in relation to the work it performs has certainly been overrated. Irregular alternations are, by definition, functionless. The variation between go and wen- is useless, since the difference in meaning is already expressed by the -t of the past. A past go-ed would perform the same work and without the burden of learning the alternation, which constitutes a real, if hardly noticed, difficulty for the native speaker and a more conspicuous one for an individual who learns English as a second language. That this is a point of linguistic inefficiency is evidenced by the universal tendency toward analogic change, which typically cancels such functionless alternations. In this matter Jespersen is correct, and the nineteenth-century theorists in error.

Morphological simplicity is therefore at least a minor aspect of efficiency, and no discernible advantage accrues to the irregularities which many linguists have tended to glorify. However, as critics of Jespersen have pointed out, while such changes in the direction of morphological efficiency do take place, the process of conditional sound change produces new alternations, so that no over-all movement in the direction of morphological simplicity is discernible.

Recapitulating in the light of our earlier consideration of evolutionary advance, we see that it is not complexity as such that is significant, it is rather the over-all degree of efficiency. But efficiency is meaningful only in terms of some function to be performed. A hoof is more efficient than toes only in relation to speed of locomotion as a function. In the function of manipulation of objects it is less efficient. Hence evolutionary advance can be determined only by reference to function or functions to be performed. The traditional criterion of morphological complexity is here of only minor significance. The basic function of language is communication.⁵ This leads us to place language in the total frame of the evolution of means of communication. The question of the evolution of language refers to the place of language among other means of communication and whether, in this wider context, a line of evolutionary advance can be discovered. To ask the question regarding language alone is like discussing the evolution of the bow without regard to its position among other weapons.

Means of communication from the standpoint of cosmic evolution can be divided into three stages: prelanguage, language, and postlanguage. Language presumably first appears with hominids. In fact, some would probably want to define hominid in terms of the possession of spoken language. Prelanguage communication is, in the terminology of the first chapter of this work,* not a sign system, since there are no combinations of elements subject to grammatical rules. There are signs and even perhaps symbols in the usual acceptance of the terms, but they form no system because there are no constructions involving the combination of elements. Prelanguage signs continue to function even in human societies as gesture and otherwise.

*Essays in Linguistics.

The advantage brought by grammar is chiefly the ability to specify separate aspects of a situation and their relations to one another. Moreover, rules of grammar allow us to combine in constructions aspects not found together in actuality. It becomes possible to state lies, hypotheses, and past and future states of affairs. In the phraseology of semanticists, it is grammar which makes man the time-binding animal.

Natural spoken language is, by general consent, the earliest sign system to appear. In accordance with the normal usage of linguistics, by "language" I shall mean natural spoken language. In addition to the values inherent in any grammatical system, certain advantages of sound as a medium help to explain why language was the first such system to appear. The use of the vocal organs, an overlaid function, did not require the development, through the slow mechanism of genetic change, of a new specialized organ. The voice is always available, involves little physical exertion, and does not interfere with any other activity, except, to a minor degree, eating. Above all, it allows the hands to be free for manipulatory activity. It may be utilized by day as well as night, and it is perceptible in all directions.

Despite all these advantages, language in its physical aspect lacks, above all, permanence and range. Moreover, while the fact that it is not confined to a single channel is, in general, an advantage, under certain circumstances, such as the desire for secrecy or the irrelevance of the message for many within range, separate channels are more useful.

The first advance in the direction of greater physical efficiency is the invention of writing, which gives permanence to speech. The effects of this invention are so great that the difference between civilized and so-called primitive peoples is most frequently defined in terms of it. Recent inventions, such as telegraphy, radio, and teletype, are all designed to give greater range and the possibility of channelized communication.

All these developments have in common that they are isomorphic with language and with one another, at least on the sentence level.⁶

Hence any inefficiencies which adhere to the semantic and grammatical systems of language continue unaffected.

In its semantic aspect certain disadvantages of language arise from its method of definition, which is implicit and the result of historic tradition. Dictionaries, which attempt to codify these traditional meanings, exercise a minor influence in the direction of standardization. But the meanings, even when so codified and standardized, commonly suffer from two important defects: ambiguity and vagueness. By "ambiguity" is meant the existence of alternative and different meanings for the same linguistic form, i. e., homonymy. "Vagueness" is the lack of agreement in regard to the instances to be included under a given term. Bertrand Russell gives a striking example. Imagine that speakers of English are confronted with a man without a single hair on his head. Presumably they will agree in the statement that the man in question is bald. Now take a man with a full head of hair and remove the hairs one by one. There will be lack of agreement among speakers of English as to the point at which the statement "the man is bald" is true.

Terms in everyday discourse usually have ambiguous alternative meanings, each of which is, in turn, vague. Ambiguity, in principle, can be eliminated simply by assigning a new and separate term for each ambiguous meaning. Actually, much ambiguity is quite harmless and even a useful conservation of vocabulary resources. For example, the use of the term "case" both in grammatical discourse and in the law courts will presumably mislead no one. Far more insidious than obvious homonyms are the closely similar, but distinct, meanings disclosed only by analysis and tending to persist even in scientific discourse, e.g., the various meanings of "function" in the social and biological sciences and in mathematics.

Vagueness probably cannot be eliminated, for empirical terms at least, but its area can be reduced and its limits specified. For example, we can define a bald man as one who has less than ten active hair follicles. It then remains to define "active hair follicle."

The needs of philosophical and scientific discourse cannot

always, in the long run, be satisfied by the use of traditional implicit definition. The first step, which involves a departure from the procedures of traditional language definition, is the use of definition by postulation but within the grammatical and semantic framework of natural language. The physicist defines "force" for his own purposes by explicit agreement, taking as his point of departure its meaning in everyday language, with the understanding that it will have this new meaning in the context of physical discourse.

But sometimes half-measures prove inadequate and, as in the case of mathematics and symbolic logic, an entire sign system is created by postulation or fiat. The form of the symbols, their meaning, and grammatical rules of combination are then all postulated.

A third line of development is the invention of various international languages. These do not, in principle, alter the physical nature of the language sign vehicle. The meanings, though all created by fiat of the inventor, are along traditional language lines and probably are as vague and ambiguous as those of natural language. The one structural advantage of such languages is the practical absence of the dysfunctional morphological complexities of natural languages. Even this advantage accrues almost to the same degree to pidgin languages.

The development of forms isomorphic to language, with the advantages described previously for the physical aspect of communication and the appearance of postulated sign systems which overcome in good part the semantic and grammatical inefficiencies of language, does not mean the supersession of language. It may rather be interpreted as a process of differentiation and specialization within the communication process, whereby each communication need becomes more efficiently served by an instrument which more adequately fulfils some specific function.

In the course of this development language comes more and more to fulfil the functions for which it is most appropriate. The constant availability and flexibility of language suggest that it will not be replaced in person-to-person interaction in the

foreseeable future, if ever. Moreover, the abolition of vagueness and ambiguity, whatever its advantages for the purely informational aspects of communication, would result in the probable elimination of humor (certainly of punning, which stems from ambiguity) and of poetry, which flourishes on vagueness. Finally, language plays a unique role in communication, which, aside from all other considerations, doubtless assures its future. If we wish to explain a symbol or a meaning, we do it in a sign system. If the term is still not understood, it must be explained in terms of a sign system of lower level, and so on. But at some point this process must reach an end. Either understanding is achieved, as evidenced by appropriate reaction, or we must resort to the co-ordination of an element or elements of a sign system with that which is not a sign, namely, a set of events. Such a system provides the level of ultimate explanation. Language serves this function, hence its generality as compared with the limited subject matter of other systems or of individual signs. Thus what is sometimes called "art symbolism" is, in a sense, secondary symbolism operating through the symbolism of language. If, for example, I "explain" a Navaho symbolic use of red as referring to the north, I am explaining it in terms of a linguistic symbol "north" which I assume to be understood. So, too, mathematical symbols are ultimately defined in terms of ordinary language.

Ontogenetically, too, we normally learn such symbolisms or postlanguage sign systems after language and in terms of language. Even when, as is possible in the case of gestures, we may learn them before language and independently of language, we may later explain them in terms of language, but never vice versa.

Finally, two other aspects of the evolution of communication may be pointed out which involve the social dimension, that is, the distribution of sign systems with respect to populations. In general, the greater the economic productivity, density of population, and facilities for transportation of persons and goods, the less likely that speech communities will differentiate into many local communities speaking mutually intelligible languages and the more the felt needs of wider communication will result in the development of standard languages and lingua francas, eventuating in extensive monolingual

communities. Likewise, the greater differentiation within a group is reflected in specialization within the realm of communication. Before the advent of mass communication, all individuals were of roughly comparable status as senders and receivers of messages, with leadership marked, no doubt, by some degree of superiority in effectiveness, if not of volume of communication. In industrial societies, specialized senders, such as editorial writers, broadcasters, and writers of books, send to far more people than those from whom they receive.

Our general conclusion, then, is that it is not language as such which evolves but rather communication in general. Within this process language does have a central and key position as the source of all postlanguage developments and the general instrument which fulfils the function of the ultimate level of explanation. While it may seem somewhat rash to prejudge the case, it appears that natural languages are all very much on the same level as far as efficiency is concerned. A comparative measure of efficiency which includes all relevant phonological, grammatical, and semantic aspects has never been worked out, and, in view of the complexity of each aspect and the disparity among them, it does not appear very likely that one can be developed. Traditional theories of language evolution have usually taken but one of these aspects, the morphological, and have further assumed a correlation between complexity and advance which is unjustified. Indeed, as we have seen, just the opposite seems more likely to be the case, so that in this limited aspect the despised pidgin languages are more advanced than such cherished forms of speech as classical Sanskrit. Certainly, then, the evolution of language as such has never been demonstrated, and the inherent equality of all languages must be maintained on present evidence.⁷ Yet in the broader sense some correlation between communication and the evolution of culture can be discerned, and language evolves by begetting that which is not language but transcends it, even while it is dependent upon it.

NOTES

1. August Schleicher, Die Darwinsche Theorie und die Sprachwissenschaft (Berlin, 1863); see also the discussion in Hermann Paul, Prinzipien der Sprachgeschichte (Halle, 1909).

2. Science, 1946, p. 469.

3. For example, M. Jacobs and B. Stern: "Scientific linguistics has therefore concluded that grammatical complexity appears to correlate little, if at all, with technological or economic levels" (Outline of Anthropology [New York, 1947], pp. 283-84).

4. Among the writings of Jespersen on this topic see particularly Efficiency in Linguistic Change (Copenhagen, 1941).

5. By "communication" in this context is meant not only the conveying of information but all those effects on the society and satisfactions of societal needs described as the functions of over-all language activity in the chapter on "Structure and Function in Language" in this work [Essays in Linguistics] (pp. 75ff.).

6. By this is meant that there are rules of one-to-one transformation between each entire expression of spoken language and some sequence of written or other symbols, without necessary one-to-one correspondence on the element level (as in phonemic writing) or some other level.

7. Languages are equal in the sense that they are all "created equal," that is, have equal potentialities. In fact, some which have undergone cultivation probably have greater resources of expression, but this is not owing to any inherent superiority. Any language placed in the same position through non-linguistic factors will be capable of similar development.

Classification based on common origin is, as has been seen, fundamental for historical and comparative linguistics. Its importance is so obvious that when language classification is referred to without further qualification, it is genetic comparison that is normally meant. Yet there are other equally legitimate methods of language classification useful for other purposes. Confusion results only when a classification reached by one method is erroneously treated as an exemplification of one of the other methods, thus leading to invalid inferences.

There are three methods of language classification which are of major significance: the genetic, the typological, and the areal. Of these, the genetic is the only one which is at once non-arbitrary, exhaustive, and unique. By "non-arbitrary" is here meant that there is no choice of criteria leading to different and equally legitimate results. This is because genetic classification reflects historical events which must have occurred or not occurred. If the classification is correct, it implies events which did occur. By "exhaustiveness" of a classification is meant that all languages are put into some class, and by "uniqueness" that no language is put into more than one class. Genetic classification, as has been seen, is based on criteria of sound-meaning resemblances of linguistic forms. Related languages are likely to be in the same geographical region but usually are not in continuous distribution. In principle, geography is irrelevant, although it is a normal result that related languages are in the same general area. This is a reflection of the types of populational movements which have in fact occurred in the past. The present distribution of English with substantial communities on four continents is, in turn, a reflection of new conditions of communication of relatively recent date.

Were people to be discovered on the moon speaking a language with the vocabulary and grammar of English, a conclusion of genetic relationship would perforce be drawn, regardless of geographical circumstances.

Typological classifications are based on criteria of sound without meaning, meaning without sound, or both. For example, using a phonetic criterion only, we might divide the languages of the world into two typological classes, those with tonal systems and those lacking tonal systems. Both classes would be extensive, but the latter would be larger. Using a semantic feature only, one might divide the languages of the world into those which have morphemes indicating sex gender and those which do not. We could combine the two criteria mentioned to produce four classes of languages: tonal-gender, tonal-non-gender, non-tonal-gender, and non-tonal-non-gender. Typological classifications are arbitrary because any criterion or combination of criteria may be used with consistent results, provided only that they have clear meaning when applied to diverse languages. Some classes may be empty. This would be so if, for example, there were no tonal languages with sex gender in this classification. As we increase the number of criteria, we increase the number of possible classes and decrease the membership of each until each language becomes a separate type. On the other hand, if we divide languages into those with vowels and those without vowels, all the languages of the world will be in the first class, while the second will be empty. The methodological likeness of typological to racial classification based on phenotypic characteristics is obvious. Many trivial and pointless classifications into language types are possible. We attempt to set up significant classifications by choosing criteria which tend to cluster together and involve linguistic traits judged to have fundamental significance. For all its other vital weaknesses, the nineteenth-century classification of languages into isolating, agglutinative, and inflective fulfilled this requirement.

Typological classifications are arbitrary, as has just been indicated, exhaustive, and unique. They have no necessary historical implications. There is in most cases a tendency for genetically related languages to belong to the same type, but there will generally

be exceptions. Moreover, many genetically unrelated languages will belong to the same type. A typological and genetic classification will probably never agree even for a restricted area. The use of criteria relevant only for typologic classifications to establish supposed genetic families is widespread. Since typologies are arbitrary, the result will be apparent discrepancies when two or more writers employ distinct typological criteria. Virtually all discrepant classifications result from the conflict between a number of purely typological classifications or between a true genetic classification and several typological ones. In the interests of scientific clarity, such terms as "family" and "relationship" should be confined entirely to their traditional reference to genetic classifications. Typological classes of languages are geographically discontinuous, and the same class is likely to have representatives in many different parts of the world.

Areal classifications are based on effects of languages upon one another, whether they are related or unrelated. Among the relevant data are borrowings, involving both sound and meaning, and influences in sound only or meaning only which are the result of historical contact. A number of languages which share many such features with one another may be called an "areal group." To avoid confusion, it seems advisable, as mentioned previously, to confine the use of the terms "family" and "relationship" to genetically connected languages. We may then talk of genetic families, typological classes, and areal groups.

Areal classifications depend on judgments that certain languages have affected one another more than each has influenced, or been influenced by, languages outside the group. Since languages in contact practically always affect one another in some way, this requires, in general, a decision as to whether a particular language has influenced some one language more than another. This, in turn, requires a weighting of judgments, some of them uncertain, about essentially separate and disparate traits. Areal classifications are therefore arbitrary within limits. They are neither exhaustive nor unique. If a language has neither received nor exerted significant influence, a situation quite conceivable through geographical isolation or recency of arrival in an area, it cannot be assigned to

any group. It might, however, as a limiting case, be considered a group by itself. It also happens that a language shows mutual influences with two groups of languages which have not affected each other. Such a language is likely to be geographically intermediate. It might then be assigned to both groups or be considered marginal. Areal groups are, almost necessarily, geographically continuous.

The resemblance of areal groups of languages to culture areas has perhaps already occurred to the reader. Both cover geographically continuous areas and are typically considered the result of diffusional influences within a restricted region. There is the same quasi-arbitrariness of classification and even the close parallel of marginal languages to marginal cultures. Since the same contacts which lead to cultural diffusion in general must lead to linguistic diffusion, it may be expected that classifications into linguistic areal groups will closely parallel culture-area classifications. Therefore, linguistic criteria relevant to language-area grouping can well be employed alongside the usual non-linguistic criteria in determining culture areas.

In the past this has not been done. In discussions by anthropologists of culture areas, the comparison with linguistic data, if made at all, is with genetic classifications. Agreements and disagreements between culture areas and genetic language areas as found on the usual language maps are then noted. The degree of congruence is often not high or is even non-existent. In a sense a genetic distribution can be considered to consist of the scattered members of portions of former culture areas. Related languages are the historical continuations of a single ancestral language which once, usually some thousands of years ago, was spoken by a culturally unified community in a continuous area. Even at that time, to judge by present situations, it is unlikely that such a language community constituted a cultural area by itself. It doubtless shared features based on linguistic contacts with a number of neighboring linguistic communities. It is evident, then, that it is the language area, not the genetic family, which corresponds to the culture area both in the historic processes of its formation and in most formal characteristics.

It has sometimes been suggested that linguistic features be mapped distributionally, as is done with other cultural traits. This is in itself a useful step, but the comparison of such distributions will not immediately result in language areas as defined here. The similarities must first be evaluated as the result of common origin, interlanguage influence, or convergence. Unless such an analysis, which assumes a correct genetic classification and a certain amount of comparative reconstruction as a basis, has been carried out, we shall be lumping together resemblances of diverse origin, and a coherent, meaningful result is not likely to emerge. There is thus no opposition between genetic and areal classification. The former is, instead, a prerequisite for the successful attainment of the latter.

Although it is clear what kinds of data are to be utilized as the basis of linguistic-area classifications, the methodological problem of determining their existence still remains. There are four classes of linguistic contact phenomena to be considered: borrowing, order, semantic influence, and phonologic influence. "Borrowing," in accordance with normal usage, is defined here as the acceptance in one language of a form, in both its sound and its meaning aspects, from another language, though usually with both phonetic and semantic modifications. There are a number of criteria which are usually sufficient to determine the existence of borrowing. The question is, in general, easier of determination if the languages concerned are unrelated, since in this case, of the two common alternative explanations—genetic relationship and chance—the first is eliminated by definition.

With unrelated languages in the absence of written records, the most powerful method is the distribution of forms. That is, we do not take into account merely the two languages concerned but all related and neighboring languages of the original pair. A form with widespread cognates in the languages related to one of the two, but restricted to the language itself or to a few neighboring languages in the language family to which the first language belongs, is surely a borrowing from the first language to the second. Accident is never totally eliminated as a possibility, but the existence of other borrowings between the same languages, particularly in the same semantic sphere, geographical proximity, and the existence of other

nonlinguistic evidences of cultural contact all add to the probability that the resemblance is not accidental. More purely linguistic factors are the length of the form and the presence of sound correspondences recurrent in other presumed borrowings. Another criterion is based on the sounds contained in the form. For example, words in Berber which contain h are borrowed from Arabic. Even without the other considerations which point in this direction, the fact that there are no words in Berber containing h without similar words in Arabic but that there are many Arabic words containing h for which nothing corresponding exists in Berber is sufficient.

Between related languages all the foregoing considerations hold, but the addition of genetic relationship as a possible explanation complicates the picture. It also brings with it, however, the possibility of applying reconstructive techniques. If correspondences are of the type found in cognates, then common origin rather than borrowing is the explanation. This is not always sufficient in itself. For example, Hausa, which is ultimately related to Arabic in the Afroasiatic family, has also been under strong direct influence from the latter. The form mútu, "to die," shows correspondences characteristic both of inherited cognates and of borrowed forms to Arabic (ya)mu·tu, "(he) dies." Distribution is useful here also. The occurrence of similar forms in literally scores of languages of the Chad group of Afroasiatic, to which Hausa belongs, in the language of many groups not subject to Arab influence makes the case for borrowing far less compelling. Its appearance in fundamental vocabulary also points to common origin as the more probable explanation. The negative argument is much stronger. The absence of forms corresponding to Hausa yâmmâ, "west" [Arabic yaman(a)], from a single language in the Chad group other than Hausa is a powerful argument against common origin in this case and in favor of borrowing from Arabic.

In principle, resemblances in meaningful order among neighboring languages belong with sound-meaning resemblances. In both instances, there is the combination of a formal aspect with a semantic aspect. Since order allows of far fewer formal possibilities than sound combinations and since meaningful order

has typically relational significances linking word classes which are necessarily few in number (possession, goal of action, etc.), the probabilities of chance convergence are considerable.

An inherited construction can be most convincingly established where a particular meaningful order is found in different and geographically disconnected subgroups and where, in each instance, surrounding unrelated languages do not share in the construction. Once the inherited construction can be established, then any divergent construction can be attributed to some change. If the divergent construction coincides with that of neighboring unrelated languages, the possibility of influence as an explanation can be entertained. In view of the limited alternatives, however, even in these cases convergence through internal development cannot be excluded as a possible explanation.

Resemblances in meaning only, as the result of semantic borrowing, are common among both related and unrelated languages. For example, throughout most of Negro Africa there is a single term meaning both "meat" and "animal"; "fruit" is expressed by a phrase meaning "child of the tree"; and "door" is "mouth of the house." Such meaning resemblances are practically always the result either of influence or of convergence.¹ The argument for historical influence is here identical with that for continuously distributed cultural traits. It is improbable, though not impossible, that such a distribution would result from more than a single origin. On the other hand, any such purely semantic trait has always the potentiality of independent origin. For example, the African idiom "mouth of the house" for "door" mentioned here has a fairly continuous distribution in Africa but reappears in Siberia. In dealing with an instance of this kind concerning linguistic data, our probable conclusion is that there were two, but no more than two, separate inventions. Separate inventions (convergence) always seem possible in the realm of meanings. A particular combination of meaning aspects in a single term or a particular phrase with specialized meaning (idiomatic meaning), unless it is an accidental homonym, in which case it has no historic significance, involves an observation of some similarity in phenomena, an implied metaphor, which, if it can be noted by one people, can presumably be noted by

another. In this respect it can in nowise be compared to, say, the plot of an entire story involving a complex of accidents, but it is rather like some single folklore motif which may be easily duplicated.

Influence of sound systems on one another remains to be considered. There are two chief mechanisms involved here: the presence of the foreign sound in borrowed words and sound changes by which an earlier sound is replaced by one which is part of the regular system of a neighboring language. This latter phenomenon presumably happens most easily through the influence of bilingual speakers, who in their "accent" replace the traditional sound by that of the neighboring tongue which they speak as their first language. The presence of sounds originating in another language through borrowings is easily ascertainable as an incidental result of the study of borrowings, as noted previously. The relative rarity of the phoneme in the borrowing language, combined with its occurrence exclusively, or almost exclusively, in words which occur in the donor language also, constitutes decisive evidence. It is sometimes held that borrowings will incorporate sounds not found previously in the language of the borrowers only if there is already a "gap" in the system ready to be filled; otherwise there will be a substitution of some inherited sound. For example, the ease with which English maintained the French ž sound in borrowed words is explained by the fact that English already had both an unvoiced counterpart š and the pattern of phonemic contrast of voiced versus unvoiced phonemes, e.g., s:z, t:d, etc. This is doubtless a factor, but not the only one, since there are well-attested cases of foreign sounds incorporated through borrowings for which no such preparatory situation exists, for example, the click sounds in Zulu and other Bantu languages in words borrowed from Khoisan languages.

Externally induced sound changes resulting in a sound system more like that of the influencing language can be inferred after the event only on a probability basis. There is no general sound change externally caused which could not potentially result from internal development. The rarer the change on a world-wide basis and in other languages of the same family, the more unlikely that it should occur purely through internal causation in just such a fashion that the sound system, after the change has been

accomplished, approximates more closely than before that of a neighboring language. The existence of several such changes in the sound system accompanied by other evidences of language contact, e.g., borrowing, greatly increases the probability of such an interpretation.

The total effect of such interinfluencing of sound systems in a given area over a long period can be very striking; even unrelated languages come to have almost identical sound systems, as, for example, among the aboriginal languages of the northwest coast of the United States and the neighboring areas of Canada. Much of the confusion which has enveloped the discussion of the origin of this situation in the area arises from the assumption, rejected earlier in the discussion of genetic relationship, that resemblances in the sound system as such are evidence for genetic relationship. Once attention is concentrated on sound-meaning resemblances, then certain genetic relationships in the area, e.g., Athabascan-Tlingit-Haida, become clear, and others can be rejected. The resemblance or lack of resemblance of the sound systems can then be investigated within the normal frame of established genetic relationships, using the established methods of reconstructing earlier sound systems. The indications are that both genetic inheritance among those languages which are related and influences of the kind discussed here have been instrumental in producing the existing situation.

To sum up, among contact phenomena, borrowing provides the most assured basis, because convergence is excluded for all practical purposes. Borrowings among unrelated languages are the easiest of all to detect. Semantic influence comes next in degree of certainty. Here convergence is a definite, though usually minor, possibility, while the genetic explanation is virtually excluded. Order constructions and sound influences are the most difficult to establish. The presence of many such indications combined with the more certain evidence from borrowing and calques strengthens the case for all, while not lending a very high degree of certainty to any particular instance. Since in outlining areal classifications it is the general fact of language contact which is of interest, not the specific validity of each inference, this will not greatly hamper the actual work of areal classification.

The culture area is primarily a diffusionist concept.

Diffusionist approaches have sometimes been treated as virtual equivalents of migrational theories. Historically they are connected, in that both types assumed prominence at the same time as a methodological weapon against nineteenth-century evolutionism through the explanation of cultural resemblances by the mechanism of historical connections originating in the movements of cultural features. Methodologically, however, the resemblances are superficial. This becomes particularly clear when the linguistic counterparts of each type of theory are considered.

The most consistent and fully elaborated migrational theory is that of the Kulturkreislehre of Central Europe.² Prominent members of this school are Graebner, considered the founder, Ankermann, Foy, Schmidt, and Koppers. The fundamental methodological concept of this school is the Kulturkreis, literally translated "culture circle." Kulturkreise are established through certain kinds of cultural similarities, summed up in the two criteria of quality and quantity, which may be briefly described as follows.

Quality refers to the comparison of individual traits from the two or more cultures which are to be demonstrated as representatives of the same Kreise. For each such individual trait, e. g., house type, a qualitative comparison will distinguish features which are largely independent of one another and not determined by the function of the material trait or institution. For example, house types can be compared for ground plan, material used, form of the roof, decorations, number and kinds of entrances, etc. If a number of such qualitative resemblances are found, the application of the qualitative criterion has led to a conclusion of historical connection. The quantitative criterion refers to the presence of convincing qualitative resemblances in a number of different traits of culture. The applicability of the quantitative criterion strengthens the case for each of the qualitative resemblances, for, it is argued, two peoples might conceivably, however unlikely the case, arrive independently at two house types which shared a large number of qualitative similarities; what practically excludes chance is the same phenomenon in a series of different traits: house types, weapons, musical instruments, social organization, religion, etc.

It is claimed by proponents of the school that the same Kreise can be discovered in various parts of the world—Asia, Oceania, Africa, and South America. The explanation is a series of migrations from Asiatic centers.

The parallelism of this method to that of the establishing of genetic relationship among languages as described in a previous chapter is obvious. Comparing single forms in two languages to reveal specific points of comparison in sound corresponds to the criterion of quality—for example, the comparison of English "hound" and German Hund. The existence of a large number of such qualitative resemblances between two languages is the application of the criterion of quantity. The Kulturkreis procedure is therefore the methodological parallel of the genetic method in linguistics, and Kulturkreise are essentially genetically related cultures. Thus, on the one hand, culture area, diffusion, and linguistic areal classification correspond and, on the other, Kulturkreis, migration, and linguistic genetic classification.

Just as in the course of linguistic genetic procedure, resemblances between contiguous non-related languages are to be explained by the disturbing factor of contact or borrowing, so, where traits supposedly diagnostic of one Kulturkreis are found in a culture assigned to another Kreis, the explanation must be diffusion, the cultural analogue of borrowing. Thus the Kulturkreislehre, far from being a diffusionist theory, finds in diffusion its chief methodological source of disturbance. The irrelevance of geographical separation to hypotheses of genetic relationship has been noted. It is this realization which underlies the insistence of exponents of the Kulturkreislehre that distance is irrelevant; that, if certain cultural resemblances obtain, common cultural origin through affiliation with the same Kreis is the only possible explanation.

It is of some interest to note that Graebner, the founder of the school, is aware in his classical Methode of some resemblance between his method and that of comparative linguistics. However, he equates the criterion of quantity with vocabulary resemblance and that of form or quality with similarity in grammar. Schmidt, for whom linguistics is a major field of interest, likewise misses

the essential parallel. Indeed, in his own linguistic work he frequently abandons normal genetic methods in favor of arbitrarily applied typological criteria, in order to demonstrate a literal agreement between his Sprachenkreise and Kulturkreise, e.g., in his classification of Australian languages.

Language provides a far more favorable ground for the application of genetic procedures than does a non-linguistic culture. A language consists of a large number of fundamentally independent features, the individual forms. Since, in principle, the relation between sound and meaning, corresponding to form and function, respectively, is arbitrary, the number of different ways in which the same function can be carried out is very large, contrasted with the limitations set by function in most aspects of non-linguistic culture. Furthermore, there is a central core of basic vocabulary and grammatical elements in language which is strongly resistant to outside influence. No comparable barrier against diffusion appears to exist in culture. Likewise, language is, by general consent, impervious to the natural environmental influences which help to produce convergence in non-linguistic culture. Since with all these factors favorable to the application of the genetic method in languages we still arrive at many distinct families and none of the wholesale connections between distant regions, such as South America and Africa, there is the a fortiori probability that the extensive cultural relationships asserted by the adherents of the Kulturkreislehre are false.

In this, as in certain other instances discussed in this book,* the application of cultural theories to language assists in their comprehension. The peculiarities of language, as contrasted with other aspects of culture or with culture as a whole, which often prevent the same degree of success, must be kept in mind. Of these, the most important are the systematic nature of language, the arbitrariness of the relation between form and function, and the lack of relation between language and external environment.

*Essays in Linguistics.

NOTES

1. Strictly speaking, one might say that meanings could be genetically related without any connection in sound. If, for example, two languages retained a complete set of kin terms, with the same meanings as a continuation of the same kinship system in the ancestral language community, but if in every case there had been replacement by new sequences of phonemes, one could say that the meanings were historically connected but not the sounds.

2. Basic expositions of the Kulturkreis point of view are F. Graebner, Methode der Ethnologie (Heidelberg, 1911), and W. Schmidt, The Cultural Historical Method of Ethnology, trans. S. A. Sieber (New York, 1939).

The great achievement of Darwin in the Origin of Species was to establish on a firm and generally accepted basis the interpretation of differences among species as arising gradually through processes of change from other species rather than once and for all by an original creative act. Of the factors of change by which new species might develop, the most prominent in Darwin's theory, but by no means the only one, was the perpetuation through natural selection of those variations best suited for survival in the struggle for existence.¹ As has often been noted, the theory that species evolve in the course of time was not invented by Darwin. It was, indeed, a familiar notion to the biologists of the preceding half-century but it was not until the careful and impressive marshalling of evidence in its behalf by Darwin in his classic work and, in particular, the advancement of natural selection by him as an explanatory principle that it became plausible to more than a minority of biological scientists.

In view of these historical developments, any consideration of Darwinian evolution must carefully distinguish the theory that species develop from other species, which is an assertion concerning the history of life-forms, from the theory of natural selection which asserts that natural selection has played a major role in producing this result. The specification and analysis of such ambiguities assumes crucial importance when the term evolution is applied to a set of phenomena as radically different from the biological as language.

There is a further ambiguity lurking in the phrase "theory of evolution," partly allied to the distinction just mentioned, but of even more fundamental importance. In the first of two senses of evolution, which in this aspect may be called transformism, it may

be contrasted with creationism as the opposing doctrine. In the second sense, which is quite distinct, it may be considered synonymous with advance or progress.

The transformationist meaning of evolution arises from the considerations involved in any class of phenomena in which the investigator is confronted with the existence of a variety of kinds or species. In such instances, there are two alternative types of theories to account for the existence of distinct kinds. According to the creationist view, each kind is a fixed type that can only vary within certain fixed bounds in the entire course of its existence. Each kind is defined by reference to certain constant and unchanging characters that constitute, in the terminology of scholastic logic, its essential or definitional predicates. Variations may occur with respect to the other characters, which are therefore accidental rather than essential. Further, this essence is a formal cause which explains the existence of the species.

Differences among species are explained according to this doctrine as issuing from distinct creative acts. Species can be created or destroyed but they cannot, by changing their essential characteristics, give rise to other and new species. It is not necessary that all kinds should have been created at the same time or that all should survive indefinitely. When confronted with fossil evidence indicating that the species of different geological epochs were, in general, different the creationist necessarily denied that any links of development connected similar but distinct species in successive periods. The theory adopted was that called "catastrophism," namely that by a series of cataclysms, earlier species had been destroyed and were replaced by more recent ones through new creative acts.

The evolutionary theory of transformation of species, as opposed to creationist beliefs, maintains that there are no fixed bounds to specific change. Therefore earlier species give rise to later ones by a process of developmental change. The fact that, in the instance of life-forms, species fall into coherent larger groupings, the genera, and that these in turn may be grouped into distinct families, and so on, in an ordered hierarchy receives its

distinctive transformationist explanation. Such groupings had long been noted and had been codified by Linnaeus in his great systematic work, which appeared more than a century before Darwin's Origin of Species. According to transformationist theory, those species that belong to the same genera are the differentiated descendants of a single ancestral species, their resemblances being explained as the result of common descent. The resemblances among those genera which belong to the same family are explained in turn by the theory that the species ancestral to each genus are the descendants of a still earlier species ancestral to the family as a whole, and similarly with larger and higher groupings. Fossil forms are, then, either such ancestors of existing groupings or additional lines of descent from them which have become extinct without leaving descendants.

The model of evolution that thus emerges is a branching tree, the varieties of today are like twigs which, as they sprout, become the species of tomorrow. These in turn likewise put forth new twigs, some of which perish while others survive and produce new differentiated descendants. Hence the transformationist theory may fittingly be called that of branching evolution.

The creationist and transformationist views are not merely two philosophic theories between which the observer chooses on the basis of predilection or metaphysical inclination. Given sufficient data we can decide between them for any particular group of phenomena. Thus the theory of catastrophism posited by the creationists was eventually abandoned because it was not supported by the geological evidence. Further, it was the ability of the transformationist theory to account for the coherence of generic and higher classificational groups which, it appears, first aroused in Darwin the conviction that species were not fixed, unchangeable types. For being struck by the number of distinct species on certain islands, which in the creationist view would be separate creations, and at the same time by their resemblance to the species of the nearest mainland, the theory forcibly presented itself to Darwin that whether by migration or whether by geographical continuity at a former period when a land bridge existed, what was originally the same species on island and mainland must during

the subsequent period of isolation have developed into separate but related species. This would explain at once their distinctness and their close resemblance, both of which, as Darwin noted, are inexplicable by the creationist theory.

What is argued here is not that the evolutionary transformationist view is necessarily the correct explanation as opposed to the creationist in every instance, but that the question can be decided on the basis of certain kinds of evidence and that, in the case of biological species, this evidence was decisive in favor of the transformationist theory.

The foregoing definition of evolution as transformation of species, in which meaning it is the logical opposite of creationism, is to be distinguished from evolution in the sense of progress in the course of evolutionary change. Because of the ethical implications of the term "progress," it might be better to employ the word "advance" for purposes of scientific discussion. By advance will be meant the theory that more complex, internally differentiated and efficiently adapted forms make their appearance in general in the later stages of evolutionary change. The ethical judgment that this occurs and is good may be called the doctrine of progress.

The distinctness of the theories of evolution as transformism and evolution as advance is indicated, among other evidences, by the fact that certain scientists have held one while rejecting the other. As was pointed out by the eminent geologist Lyell (1863), who distinguished these two theories by the names "transmutation" and "progress," it is quite possible to hold the creationist and progressive views at the same time. For example, those biologists in the earlier part of the nineteenth century who adhered to the catastrophist version of creationism maintained that each successive creation marked an advance over the previous one in the sense described above.²

The particular mechanism of evolutionary change to which Darwin attached major significance and whose plausibility was a primary factor in the spectacular success of his theory was, of course, natural selection. Now, as Darwin states repeatedly, the descendants

of a particular life-form are, through the agency of natural selection, likely to be more efficient than their ancestors. There is, therefore, implicit in the notion of natural selection, the theory of the inevitability of continuous advance in the series of life-forms. It is true, moreover, as an empirical fact, that the paleontological evidence, as we go back in time, becomes increasingly confined to forms of simple and relatively undifferentiated structure and of limited range of adaptation to environment. It was precisely one of the recommendations of the theory of natural selection that it helped to make this temporal advance intelligible.

However, it is a well-known fact of the history of biology that the status of natural selection as a major factor in evolution has been less secure than the acceptance of the reality of evolution in the sense of transformation of species. Likewise the concept of advance has tended to remain a vague and generally unsatisfactory notion to many biologists. Thus George G. Simpson (1949, p. 117) states, "Whether recent man is to be considered more complex and more independent than a Cambrian trilobite will be found subject to qualification and definitions." Among the difficulties here are that efficiency of adaptation is always relative to a particular environment while the environment itself changes in the course of time, and that there are many scales of efficiency so that, of two species compared, one may have superiority in one respect and the other in some other respect and these scales are, strictly speaking, incommensurable. For these reasons the definition of evolution as transformation appears to be more fundamental than the definition in terms of advance.

It is one of the contentions of this paper that the theory of evolution as transformation applies mutatis mutandis, and with relatively minor modifications both to linguistic and biologic change. This agreement was noted both by biologists and linguists in the period immediately following the publication of Origin of Species. Thus Darwin himself remarks in The Descent of Man, a later work, that "the formation of different languages and of distinct species and the proofs that both have been developed through a gradual process are curiously parallel" (1871, p. 40).

In linguistic science, the creationist view is represented by the Biblical account of the Tower of Babel, according to which all language differences were created at the same time by the confusion of tongues. This theory was superseded by the transformationist account much earlier than in the instance of biology. Thus Max Mueller, an outstanding linguistic scholar contemporary with Darwin, in spite of his opposition to Darwin's views regarding the animal descent of man, was able to say that "in language, I was a Darwinian before Darwin" (1873, 7:662), while August Schleicher, another leading linguist of the period, in a published lecture "Die Darwinsche Theorie und die Sprachwissenschaft" (1863) spelled out this parallel in detail.

The event that marks most clearly the triumph of transformism over creationism in linguistic science was the recognition that the resemblances among the languages we now call Indo-European are to be explained as a result of common inheritance with differential change from an extinct ancestral form of speech. The acceptance of this theory is usually, but somewhat arbitrarily, dated from a statement by Sir William Jones substantially to this effect in 1786 (Jones, 1788). In fact, both in the case of the Semitic and Finno-Ugric languages, this explanation had been current even earlier. Thus the recognition of transformism in linguistics substantially antedates the first modern statement of this theory in biology by Lamarck in 1801.

Probably the chief factor in the early acceptance of this type of explanation in linguistics as compared with biology is the vastly more rapid rate of change in language. The common-sense objection to transformism in biology, namely, that actual changes in species had never been observed in historic times and that, to all appearances, species were fixed types, appears to have been the most powerful single factor in the general rejection of evolution by biologists in the period preceding Darwin. Language, within the realm of individual experience and unaided by records of its past, seems fixed, no doubt, but not to the same degree. Older people can recall vocabulary items and idioms which were current in their youth but are no longer heard. On occasion, they may even have noted phonetic changes. Thus the older generation of New Yorkers

remembers when the oi diphthong in such words as "hurt" was general and accepted among educated speakers and has witnessed its replacement, at least among educated speakers, within an individual life-span.

These changes, apparently small within the lifetime of a single person, display powerful cumulative effects in periods of time well within the scope of written records. Thus, Anglo-Saxon exhibits differences from modern English comparable with those of modern German. If Anglo-Saxon and modern English were spoken contemporaneously they would undoubtedly rank as separate languages. It was possible, then, actually to observe in this historically well-attested instance the change of one language into another.

In general, languages ancestral to existing groups of genetically related languages, which would correspond to the fossil evidence of biology, take us back to periods before the existence of written records. However, in the well-known instance of Latin, there are abundant records of a language, which through a series of locally different variants, has given rise to the existing diversity of Romance local dialects and standard languages. In view of these known facts, it was not too audacious a step to assume that in similar fashion an ancestral language had once existed bearing the same relation to the existing branches of Indo-European that Latin held in relation to Romance speech-forms. It became a mere historical accident that Latin was attested in written form whereas the Indo-European *Ursprache*, which was spoken before the existence of writing in the area of its occurrence, could not be known through direct evidence of this kind.

The nature of the parallel between the evolution of languages and species, which so struck both linguists like Mueller and Schleicher and natural scientists like Darwin and Lyell, refers to the conception of evolution as transformation of kinds. The transmission of physical characters by the genetic mechanism corresponds to the transmission of language from one generation to the next or one population to another by learning. In both cases, variations arise, some of which

are perpetuated. In both instances geographic isolation, whether complete or imperfect, leads to the perpetuation of locally different variants. Difficulties of determining where a variety ends and a species begins, difficulties that were important factors in Darwin's disillusionment with the creationist theory, resemble the linguist's difficulties in defining language as opposed to dialect. Ultimately these variant descendants became distinct enough to be ranked indisputably as separate languages or species. The parallelism is further indicated by the metaphor of the branching tree common to both disciplines.

The status of transformist explanations of linguistic similarities was further enhanced by the successful reconstruction of essential features of the ancestral language through systematic comparison of features of the descendant languages, notably in the instance of Indo-European where, as is the rule, the ancestral language was not known from written records. This enterprise received a great impetus through the discovery, which was not long in coming, that in certain respects, particularly in regard to the sound system, changes were not haphazard but rather showed a surprising degree of regularity. This discovery of the regularity of sound changes, first announced in the specific instance of the consonantal changes of Germanic as compared to Sanskrit, Greek and Latin by Rask (1818) and Grimm (1822) and which came to be known as Grimm's law, aided greatly in making comparative linguistics the most systematic in its method and reliable in its results of all the reconstructive historical sciences dealing with man in his sociocultural aspects.

Just as transformism is the analogue of genetic relationship, so the creationist view of fixed species is implied in the use of classificational criteria with typological rather than genetic validity. Typological classifications have their legitimate uses provided it is made clear that they have no necessary historical implications. The distinction between genetic and typological classification rests on the criteria employed in classification, and here again there is a parallel between biology and linguistics. In the terminology of biology, we wish to distinguish between homologies, or similarities

that are the outcome of true common descent, and analogies which result from convergence, generally through similarity of function, and which are irrelevant to genetic classification.

In language it is characteristically resemblances involving sound without meaning or meaning without sound that provide the basis for typological classifications. An example of the former is a classification of languages into tonal and non-tonal, in which all languages will fall into one class or the other regardless of the presence or absence of concrete sound-meaning resemblances. For example, the tone languages of West Africa, Southeast Asia and indigenous Mexico will fall into one typological class and even languages closely related to any of these will be in the other non-tonal group if they differ in regard to the particular typological criterion employed. An example of a criterion of meaning without sound is the use of sex gender as a principle of language classification in certain languages there are morphemes, that is sequences of sound, with the meaning "masculine" and "feminine," while in the non-sex gender languages they are absent.

The use of any such criteria for supposed genetic classification—and they continue to be widely employed in certain areas—requires the unstated assumption that certain features like the essential as opposed to the accidental attributes of the creationists, are fixed and define the species or, in this instance, the language family. Thus when a writer on Southeast Asia states that Annamite cannot belong to the Austroasiatic family of languages because it is tonal whereas the other recognized members of the family are not, he is assuming that a non-tonal language can never evolve into a tonal one. If this statement were true, we would have two or more languages at the beginning and each would have one of its essential attributes, tonality or non-tonality, and would be incapable of losing tonal structure if it possessed it or acquiring it if it did not. This is the precise analogue of the notion of fixed species.

What decides the case for real historical connection is the existence of resemblances in both sounding and meaning, such as exist between English and German in basic vocabulary and specific

morphemes with grammatical function. Cognate forms are therefore the methodological equivalent of homologies in biology. Because of the arbitrariness of the relation between sound and meaning in language, in that any sequence of sounds is capable of any meaning, these provide a precise parallel to the non-adaptive characters of biology.

It seems, at first blush, a much more important thing to say regarding a language that it is tonal or has gender than that the word for "nose" is Nase and this perhaps accounts for the persistence of such criteria which, on the face of it, seem to involve more impressive resemblances. Darwin, in his discussion of the criteria of biological classification, notes likewise that it is not the functionally important characters that are significant for classification but rather an accumulation of apparently trivial non-adaptive details:

It might have been thought (and was in ancient times thought) that those parts of the structure which determined the habits of life and the general place of each being in the economy of nature would be of high importance in classification. Nothing could be more false (1936, p. 320).

Once it is realized that a classification based on gender or non-gender is similar in principle to a biological classification into flying and non-flying animals and that a Semitic language which ceases to be triliteral does not cease to be a Semitic language by descent any more than a bat ceased to be a mammal when it began to fly, then typological classification can resume its legitimate place without giving rise to the confusions that have marked this type of endeavor in the past.

The distinction between the fact of evolution as specific change and the mechanism of survival of the fittest was pointed out in an earlier section of this paper. Darwin himself extended the parallel between language and biology in this instance also. The new linguistic forms that arise continually in any language community are likened to variations, only the fittest of which survive and become incorporated in the linguistic heritage. Again

Lyell (1863) in his elaborate comparison of languages to biological species, notes the spread of specific languages over wide areas followed by their later differentiation into separate languages and the extinction of the other languages spoken in these territories. This sequence of events resembles closely the biological processes of adaptive radiation and extinction of species. Natural selection as applied to language would then involve an intralinguistic struggle for survival among forms within the language and a battle among languages in which some spread and produce descendants while others perish.

Regarding the intralinguistic struggle, linguists would probably agree that many changes are functionally indifferent and that while certain changes make for greater efficiency there are likewise certain outcomes of normal linguistic processes of change, such as grammatical irregularities and semantic ambiguities, which are functionally negative. Taking linguistic change as a whole, there seems to be no discernible movement toward greater efficiency such as might be expected if in fact there were a continuous struggle in which superior linguistic innovations won out as a general rule.³

Similarly, it can be seen that one language succeeds another, not because it is more advanced as a language, but for extra-linguistic reasons of military, economic or cultural superiority of its speakers. Nor has any people ever perished because of the inadequacy of its language. This is not to say that there are not important differences between languages that have been the object of literary cultivation and those that have not, or those which possess an extensive technical vocabulary and those lacking in this regard. However, such differences are but a reflection of non-linguistic differences. They affect nothing basic in the language itself; any language is capable of literary elaboration or technical expansion if non-linguistic circumstances encourage or require it.

Any attempt to show the existence of evolutionary advance in language development must rest on a typological basis. The linguistic typology prevalent in the nineteenth century which in its

most common version involved a threefold classification into isolating, agglutinative and inflective is an instance of such a typology. For such a typological analysis to prove the existence of evolutionary advance in language requires, in addition to a methodologically valid typological procedure, the proof of two further premises. The first of these is that, when the types are arranged in some given order, it can be demonstrated or at least made probable that there was once a time in which all languages belonged to the most "primitive" of these types. Following this, there should be a stage in which the next most advanced type existed alongside survivals of the earliest type, and so on. This is similar to the requirement that for stone tools to be considered a more primitive stage of technology than metal tools we must demonstrate that there was once a period in which stone tools existed while metal tools had not yet made their appearance.

The other requirement is a proof that the criteria employed in distinguishing the typological classes are not irrelevant to the actual uses to which language is put so that the criteria for the more advanced types involve characteristics that can be shown in some manner to be adaptively superior to the criteria which distinguish languages lower on the scale of evolutionary advance.

The well-known nineteenth century typology alluded to above was in its most commonly accepted form considered by almost all of its adherents to be a typology of evolutionary advance. In fact, this typology failed on all three grounds mentioned. It was not a methodologically valid typology. since the criteria were never clearly stated in such a manner that they might be applied reliably to all languages. Further, there was no proof of the chronological sequence concerned and there was no proof that isolating languages, such as Chinese, were any less efficient in expressing thought than inflective languages such as Sanskrit.

Those who posit a number of stages in the development of thought and endow these stages with historical reality in addition to conceptual validity, will generally seek support from the data furnished by language. That is, they will tend to see in language at once the reflection of various stages of mental development and a

kind of evidence in language, by this very fact, of the validity of their analogies. Implicit in all such attempts is a typology defining these stages and such a typology must satisfy the requirements discussed above. One example is the approach of Levy-Bruhl (1910) which in setting up two polar types of mentality, pre-logical and logical, uses evidence from language in support of this thesis. His attempts and those of similarly oriented writers have generally used linguistic evidence in such a fashion that virtually all linguists find them unconvincing. The issue is, however, of some significance because in certain other disciplines the naiveté of such employment of linguistic evidence is not always realized.

From the discussion thus far it may seem that the positive contribution of Darwinism to linguistic science is minimal. Our results might be summarized as follows: The concept of evolution can be analyzed as involving two major but independent components. The first of those, the notion of transformation of kinds, is valid but was well established in linguistics prior to Darwin. The second component, that of progress or advance, is not valid in the instance of language and its application whether under the flag of Darwinism or under other influence has led to no positive results.

Yet one question remains—the origin of language itself in the evolutionary process—and it is precisely the success of Darwin's ideas in the biological sciences that makes this problem in the end unavoidable not only for linguistics, which it would appear chiefly to concern, but for the other sciences that deal with man as well. For, by any definition of emergence, language is a major instance of the appearance of something essentially new in the course of evolution comparable in its significance only to such other basic emergents as life itself or intelligent behavior.

Darwin himself sought to bridge the gap by showing that human language is but a further elaboration of germs already found in animal behavior. Max Mueller, on the other hand, saw the difference as so great that he rested his argument against the possibility of human descent from other animals on the possession of language by man:

. . . it becomes our duty to warn the valiant disciples of Mr. Darwin that before they can claim a real victory, before they can call man the descendant of a mute animal, they must lay regular siege to a fortress which is not to be frightened into submission by a few random shots; the fortress of language, which as yet stands untaken and unshaken on the very frontier between the animal kingdom and man (1873, 8:22).

Today, presumably, no scientist would accept this as a refutation of the Darwin theory. We distinguish between the evidence for the truth of a fact and the theories designed to account for the fact. If the linguist cannot furnish a satisfactory theory of the origin of language, this does not invalidate the other evidence for the descent of man from forms of life that did not possess symbolic behavior. It rather poses a problem for the sciences dealing with man to explain how language could have arisen in the course of evolutionary development.

The fundamental role of language in making possible that accumulation of learned behavior which we call culture and which is the distinctively human mode of adjustment is appreciated by all anthropologists and social scientists in general. At the present time, however, it is probably more usual to phrase this difference between man and other species in terms of symbolic as distinct from merely sign behavior, with the understanding, no doubt, that language is by far the most important type of human symbolic behavior. It would seem, however, that this view of language as merely one, even if the most important kind of symbolic behavior, tends to obscure the particular and unique functions of linguistic compared to other types of human symboling. Among non-linguistic human symbols we may distinguish first certain individual symbols. Some of those are found in every human community. An example is the sending of flowers at a wedding, which would be generally stated to have a symbolic significance. It is true that only human communities have symbols of this kind, but they are clearly isolated in that they do not fit into any system of multiple related symbols. A more elaborate instance of a non-language symbol is a set of traffic lights since this is a system of several symbols, red, green,

and it may be, amber. However, in distinction to language, the number of messages is finite and, indeed, extremely small.

The subordinate status of such symbols in respect to language is of a more fundamental nature than their mere isolation or finiteness, for it is a subordinate status shared even with such elaborate and infinite systems as those of mathematics. Language has a unique role which results from its generality of reference and ontogenetic priority in the life history of the individual. For example in descriptions of Navaho religion we learn that certain colors symbolize certain cardinal directions, i. e. black symbolizes north. We take this to be a direct explanation of the symbol, but in fact we have described it by another symbol, the Navaho word for "north." If we do not know what this means we may translate into English. The infinite regress of explaining symbols by other symbols must have a conclusion, the point at which understanding is reached. If this is itself a symbol system it is always some language, which is thus the ultimate level of explanation. If this also fails we must resort to non-symbolic behavior such as pointing or the like. This even applies to such complex and elaborate systems as mathematics. We all learn some language before we learn mathematics and mathematics is ultimately explainable in ordinary language but not vice versa.

It is conceivable in certain instances that a non-linguistic symbol might be learned without language actually being employed. Thus, by standing on a corner and noting the events associated with the different traffic signals an observer might discover the system involved. It is unlikely that the reasoning involved could be carried out before language was mastered. I do not believe that any fond parent of a pre-language child would risk the experiment. Even if such learning were possible, it would still be true that such a system could not occur in a community without language and that verbal behavior figured indispensably in its invention, its establishment, and the diffusion of the necessary knowledge concerning it in the community. In other words, non-linguistic symbols always arise through some kind of concerted action and pre-arrangement which depends on language. To cite another illustrative example, the symbol system "one if by land and two if by sea,"

which functioned in connection with the ride of Paul Revere, was a pre-arrangement agreed on by means of language. The relevance of these considerations in the present connection, is that since all other symbols have language as a precondition, the evolutionary problem of the origin of symbolic behavior resolves itself into the problem of the genesis of language. Once language exists, the conditions for the existence of the other kinds of symbols are fulfilled.

The question then, which will be considered here in only a few of its numerous aspects, is the difference between sign behavior, which is pre-linguistic intelligent behavior, and linguistic behavior, which is behavior mediated by the symbol system we call language. We may define a sign, A, as a state of affairs that is evidence to an organism of another state of affairs, B, not simultaneously experienced but associated with it by temporal contiguity in the past. Then A is a sign of B, or we may say that A means B. In these terms, classical or instrumental conditioning is easily restated in the language of sign theory. In the instance of Pavlov's experiment, the bell (A) is a sign of food (B) to the dog. That this relation indeed holds is indicated to the observer by the organism's response of salivation to the conditioned stimulus. Thus salivation itself becomes a sign to the observer that the bell is a sign of food for the dog. In such cases, we may say that the bell as a sign has a meaning functionally equivalent to a sentence in language such as "food will be offered." Such a sign, which is equivalent to a sentence in language, may be called "complete."

The difference between sign and symbol is usually described in terms of the arbitrariness and conventionality of the latter. However, the connection between the bell and the food is conventional also and the two are without causal connection. For sign behavior all that is required is that the sign and thing signified should have been regularly associated in the previous experience of the organism. In many discussions of language learning, the symbolic counterpart of the sign is some single word, which is isolated from its context in a sentence and is therefore incomplete. The question is then raised how this word becomes associated with the thing it signifies. The paradigm is still that of sign learning and this is not disguised

by the superficial difference that the physical sign vehicle is a sequence of articulate sounds. This is no doubt a stage in the human acquisition of language. In principle it would appear that animals are capable of such responses. It should also be obvious that the fact that a parrot speaks or responds to what to the human is a whole sentence does not make it any the less a single sign.

The difference between a symbol such as a sentence and a sign such as the bell of Pavlov's experiments is that the symbol analytically specifies the situation to which it refers. Particular parts of the sentence refer to particular aspects of the situation, whereas the bell is a unitary sign for an unanalyzed situation. The meaning of a sentence cannot be explained in every instance by past experience in which, like the bell, it has been associated with the state of affairs it describes. When we have mastered language, we can respond appropriately to a sentence we have never heard before and which cannot therefore have any association with our experience, or we can construct such a novel sentence.

How is this feat accomplished? The key, I believe, is the first postulate of Bloomfield's (1926) set, that in every speech community some utterances are partly alike both phonetically and semantically. For example, the utterances "Take the apple!" and "Take the banana!" are partly alike in sound and meaning. What is different phonetically between the utterances refers to what is different about the two situations and what is the same refers to what is constant. If we now take the sentence "Drop the apple!" the contrast between this situation and the one correlated with "Take the apple!" confirms our analysis of "take." All this has doubtless been facilitated by experience during the period in which the child learns such words as "apple" and "banana" as isolates, not yet as parts of symbols, i. e. sentences. The evidence that analysis has taken place is the ability, having learned the three sentences, "Take the apple!" "Take the banana!" and "Drop the apple!" now to understand or reproduce the new sentence "Drop the banana!" without previous experience of it. It is this power that language possesses of analyzing experience and then combining the parts isolated by analysis into new syntheses that enables us to talk of past and remote future experience, to entertain hypotheses, tell lies and talk grammatical nonsense. Initially, however, there must

have been coordination between linguistic and non-linguistic events in the experience of the learner. Let us imagine a community of schizophrenics each continually verbalizing in detached fragments having no reference to the immediate situation, with no internal sequential connections nor with connections to what others are saying! Then it is obvious that even the most talented observer unacquainted with this language could never acquire it by considering the linguistic behavior of its speakers.

The rules by which novel utterances are understood or constructed involve an analysis into classes of words and smaller meaningful units, rules of combination and rules of semantic interpretation. This analysis is what is called grammar. The ability to carry out grammatical analysis would then seem to be one of the things that distinguishes man from other animals. It involves what for want of a more suitable term might be called "multiple abstraction." At the same time that the learner abstracts one element from its context and associates it with some aspect of the situation, he is likewise analyzing other parts of the utterance in similar fashion. We might therefore call language a 3-ring, or more accurately an n -ring abstractional circus since there is no upper limit to the length of sentences. To carry all this out, man must moreover compare what is in his immediate experience with past sentences and the situations associated with them.

It would seem then that, as might have been anticipated, language does involve a new skill of which other animals are incapable. Yet, this skill can still be understood as a stage that depends on the sign skills occurring in pre-language behavior. It is hoped that the present analysis of the basic essentials of symbolic behavior, while it renders full justice to the status of language as an evolutionary emergent, may also serve to make this emergence appear understandable so that, even as Darwin believed, no conceptually unbridgeable gap separates man from his nonhuman ancestors.

NOTES

1. Among other mechanisms accepted by Darwin are the inheritance of acquired characters and the influence of environment.

2. Thus Lyell states, "Writers who are most in favor of transmutation . . . are nevertheless among those who are most cautious, and one would say, timid, in their mode of espousing the doctrine of progression; while, on the other hand, the most zealous advocates of progression are oftener than not very vehement opponents of transmutation" (1863, p. 451-2).

3. Almost alone among linguists, Jespersen (1941) maintain that linguistic change is in the direction of greater efficiency. His examples, practically all drawn from Indo-European, suggest a particular drift in regard to structural changes in that family rather than a universal linguistic process.

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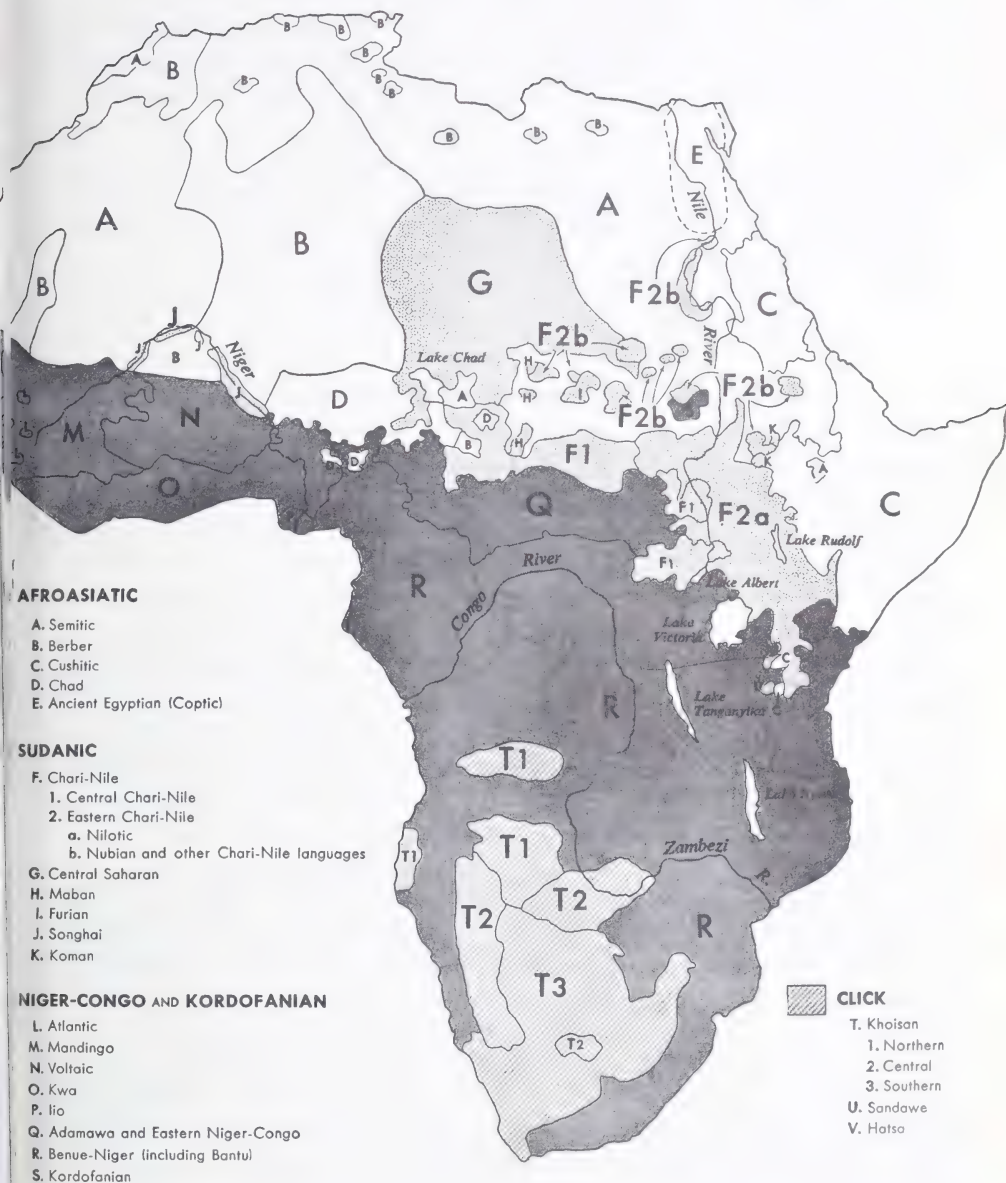
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Africa, particularly that part which lies south of the Sahara, is characterized by a great multiplicity of languages. In the absence of a generally accepted method for distinguishing between dialect and language, no exact figure can be given. On any reasonable criterion, however, the number of distinct languages is well above eight hundred. Thus, one reliable source mentions 248 as the number of languages in Nigeria alone. Many of these languages, of course, have only a small number of speakers, but others are widespread and spoken by millions—including in this figure both native speakers and those for whom the languages function as an auxiliary means of communication. Even before the period of intensive European contact, such languages as Swahili in East Africa and Hausa in West Africa were widely employed as *lingua francas* (languages used in common by multilingual groups). In spite of their great diversity, the languages of Africa fall into a relatively small number of stocks of apparently distinct origin. The four major stocks are Afroasiatic, Niger-Congo (the former West Sudanic, including Bantu), Sudanic, and Click (the former Bushman, including Hottentot and certain other languages of East Africa).

Although the four major African stocks cannot be shown to have a single origin, there are some linguistic characteristics shared by large numbers of African languages which are infrequent or nonexistent elsewhere and help mark off Africa as a linguistic area. Tone, the existence of systems of nominal classification, and verbal derivations are discussed below. Vowel systems are generally simple without umlauted vowels or other modifications except nasalization, which is fairly common. Outside of most Afroasiatic languages, syllables are usually open, that is, end

AFRICAN LANGUAGE GROUPS



Approximate distribution of the main native language groups is shown on the map (opposite page). Although the number of different languages is very high (perhaps more than 1,000), native languages derive from four basic stocks. These are represented by the shaded and unshaded portions of the map. Key letters indicate divisions of the main stocks and are used in localities where interrelated languages are spoken. The map also shows the distribution of European colonial languages, which often serve as

a common language between language groups, are not included in this presentation. The dotted line at E shows the area where Ancient Egyptian was spoken, but the present language is Arabic. Certain other distributions, too minute to be shown on the map, include complex variations in the Sudanic languages; pockets of Fulani in the Atlantic subgroup of Niger-Congo (L) found as far east as Lake Chad; and Bantu (R) encroachments on the territory of the Click-speakers.

only in vowels. The initial sequences of nasal plus voiced stop are common such as mb- and nd-. Outside of clicks, the labio-velars consisting of simultaneous labial and velar closures (kp and gb) and of imploded stops involving an inrushing instead of expulsion of air are common and seldom found outside Africa. The tonal systems usually involve two or three significant pitch levels, unlike such languages as Chinese which use rises, falls, and other contours. Many semantic idioms are likewise found through most of Africa, such as the phrase "mouth of the house" for "door," "children of the hand" for "fingers," and in general the use of the term "child" as a diminutive.

During the nineteenth century, with the opening up of interior Africa to Europeans, substantial linguistic information regarding Africa, particularly the southern portion, became available for the first time. This led to the pioneer attempts at overall classification by such investigators as R. Lepsius, F. Müller and R. N. Cast. In the first two decades of the twentieth century, chiefly through the efforts of C. Meinhof and D. Westermann, the former a Bantu specialist, the latter a student of the languages of the Sudan, a widely used general classification of African languages emerged. According to this scheme, the languages of the continent were divided into five families: Semitic, Hamitic, Sudanic, Bantu, and Bushman. These were distributed in general from north to south in this order. The first two families were presumed originally to have been spoken by Caucasoids, the second pair by Negroids, while the last was the language of the Bushman race. Although widely accepted for a time, this classification had obvious weaknesses and has now been superseded. Its major defects were the following. 1) As Westermann himself demonstrated, Bantu is related to the large Western Sudanic group of languages in a family to which the languages of the East Sudan do not in general belong. 2) Semitic likewise is not independent, but is related to Hamitic. As M. Cohen and others have indicated, Hamitic is not a valid unit within this larger group but simply the name traditionally applied to all non-Semitic branches. 3) Of the various proposals made by Meinhof regarding the Hamitic status of a number of languages (e.g., Fulani, Hottentot, Masai), almost all are generally admitted now to be incorrect. Only

Hausa, to which a large number of languages in the Chad area should be added to form a Chad subgroup, can be considered to be Hamitic and therefore a branch of Afroasiatic (formerly Hamito-Semitic). The result of these overall modifications is the present system.

Afroasiatic. Afroasiatic languages are characterized phonetically by the absence of tone, otherwise common in Africa. An exception is found in the Chad languages, which have probably acquired this feature under the influence of neighboring Niger-Congo and Sudanic languages. We may note also the frequent occurrence of pharyngeal and laryngeal consonants and of complex consonant combinations otherwise rare in Africa. Outstanding grammatical characteristics are sex gender in the pronoun, noun and verb including the second person, varied patterns of noun plural formation, including partial reduplication, internal vowel change and suffixing, and a complex set of derived verbal forms (passive, reflexive, causative, etc.). The exclusive use of tri-consonantal roots seems to be a specialized Semitic development.

Languages of the Afroasiatic family are exclusively predominant in North Africa. They are also widely found in East Africa (Ethiopia, Somaliland, Tanganyika) and in western Asia. There are five branches: Ancient Egyptian, Semitic, Berber, the Cushitic languages and the Chad languages.

Ancient Egyptian. Ancient Egyptian, known as Coptic in its later stages when it was written alphabetically, is now extinct, having been replaced by Arabic. It is still used as a liturgical language by the Monophysite Christian Church of Egypt.

Semitic. Semitic divides into Akkadian (now extinct), Canaanite (Hebrew, Phoenician including the Punic of ancient North Africa), Aramaic, North or classical Arabic, and South Arabic-Ethiopic. Of these, classical Arabic was carried across all of North Africa and up the Nile Valley into the Sudan by the Moslem invasions of the early Middle Ages. It is now spoken in a wide variety of locally differing dialects. Arabic is the native language of some Negroid groups, e. g., the Shuwa of the Lake Chad region,

and is used as a lingua franca by the racially Negro people of Wadai and Darfur east of Lake Chad.

The other Semitic languages of Africa belong to the Ethiopian division and are most closely akin to the South Arabic languages of the Sabaean and Minaean inscriptions. These languages came into Africa by a not easily datable migration from southern Arabia, well before the beginning of the Christian era. The Ethiopian Semitic languages fall into two groups. The northern includes the extinct Ge'ez (classical Ethiopic), Tigre, and Tigrinya. The southern contains the Gurage dialects; Harari, the local language of the city of Harar; and most importantly, Amharic, now the standard language of Ethiopia with nearly six million speakers.

Berber. Berber, formerly spoken in all of North Africa except Egypt and in the Canary Islands, now survives mainly in the western part of this area and among the Tuareg of the Sahara. Ancient Berber inscriptions are found in an alphabet which is probably of Carthaginian origin, a system of writing still in use among the contemporary Tuareg.

Cushitic. Cushitic, spoken in East Africa, consists of five branches: a northern or Beja group; an eastern group which includes the important Somali, Galla, Saho-Afar, and Sidamo languages; a central group spoken by the Agau peoples who have been largely Semiticized culturally and linguistically; a western group consisting of Kaffa and numerous other small linguistic communities in southwestern Ethiopia and adjoining regions; and a small southern group consisting of a few languages of minor importance, such as the Iraku of Tanganyika.

Chad Languages. The Chad languages, a very large substock, are distributed chiefly in the northern region of Nigeria and eastward into the Cameroons and the Republic of Chad. By far the most important Chad language is Hausa, with well over six million native speakers. It is the dominant language of the northern region of Nigeria and the most widely used auxiliary language of West Africa. It possesses a literature written in an

alphabet based on the Arabic. Other Chadic languages include Bolewa, Angas, Ankwe, Tangale, Bura, Margi, Higi, Mandara, Musgu, Mubi, Sokoro, and Kotoko-Buduma.

Niger-Congo. The Niger-Congo languages, the largest linguistic stock of Negro Africa, are generally tonal. A conspicuous feature of the grammatical structure is a set of noun classes, marked by separate affixes for the singular and plural. As with the sex gender systems of many European languages, in many of the languages adjectives and pronouns agree in class with the noun to which they refer. However, as contrasted with sex gender languages which have at most three categories—masculine, feminine and neuter—the number of classes is large and sex is not a basis of distinction among them. For example, human beings belong in one class, animals in another, trees (along with other items not easily classifiable) in another, while some of the classes have no discernible basis of meaning classification.

The Niger-Congo languages may be tentatively divided into eight substocks. From west to east we have: an Atlantic subfamily, Mandingo, Voltaic, Kwa, Benue-Niger (including Bantu), Ijo, Adamawa, and an Eastern subfamily.

The Atlantic Subfamily. The Atlantic subfamily consists of languages spoken primarily in the Republic of Senegal, the Republic of Guinea, Portuguese Guinea, and Sierra Leone. Among the languages in this group are Wolof, the local language of Dakar, also spoken elsewhere in the Republic of Senegal; the Temne of Sierra Leone; and Fulani, a language with some millions of speakers who have migrated as far east as Wadai beyond Lake Chad.

Mandingo. The Mandingo languages are found immediately to the east of the main body of Atlantic languages, chiefly in the upper valley of the Niger and in Sierra Leone and Liberia. Important languages of the Mandingo group are Mende in Liberia, and Malinke, Bambara, and Dyula in Mali. Dyula is widespread as a commercial lingua franca. Smaller scattered communities of speakers of Mandingo languages are found as far east as north-eastern Nigeria.

Voltaic. The Voltaic or Gur substock is dominant in the Voltaic Republic and the northern territories of Ghana. Among the languages included here are More, the language of the indigenous Mossi kingdom; Dagomba; and Dogon. The Senufo languages farther west are probably to be considered a subgroup of the Voltaic languages.

Kwa. The Kwa languages have a large west-east extension bounded by the Gulf of Guinea on the south. In the extreme west, the inclusion of the Kru group of Liberia is doubtful. The Kwa substock includes such important languages as the Akan group in the Republic of the Ivory Coast and in Ghana; Fõ, the language of the aboriginal state of Dahomey; and Gã, the local language of Accra, the capital of Ghana. In Nigeria the two chief languages of the southern part of the country, Yoruba and Ibo, are Kwa languages. Also included are Nupe and Bini, the latter the language of Benin, the celebrated art center.

Benue-Niger. The Benue-Niger substock contains the vast Bantu group of languages as a division. Bantu languages are spoken to the partial or complete exclusion of other stocks in most of the Congo basin, in the Portuguese colonies of Angola and Mozambique, in the territory of the Federation of Rhodesia and Nyasaland, and in the Union of South Africa.

The most important Bantu language is Swahili, with approximately eight million native speakers. In addition Swahili is spoken as a second auxiliary language in almost all of East Africa and even in the eastern part of the former Belgian Congo, where it is known as Kingwana. There is a traditional literature of considerable proportions, written in an adaptation of the Arabic alphabet. Other important Bantu languages with estimated numbers of speakers are Zulu (2,500,000), Xhosa (2,400,000), Pedi (700,000), Sotho (600,000), and Chwana or Tswana (500,000) in the Union of South Africa; Makua (1,000,000), Thonga (800,000), and Shitswa (500,000) in Mozambique; Nyanja (400,000) in Nyasaland; Shona (1,500,000) and Bemba (500,000) in the Rhodesias; Kikuyu (700,000) in Kenya; Luganda (1,000,000), the chief language of Uganda; Nyaruanda (5,000,000) and Rundi (1,500,000) of Ruanda-Urundi; Umbundu (1,700,000) and Kimbundu (1,000,000) in Angola; and

the four chief languages of the former Belgian Congo, Luba (3,400,000), Kikongo (1,200,000), Lingala (700,000), and Mongo-Nkundu (500,000). The non-Bantu languages of the Benue-Niger substock, often called semi-Bantu, are spoken in central and eastern Nigeria and the Cameroons. Among these may be mentioned Tiv, Jukun and Efik.

The Ijo language of the central coastal area of southern Nigeria appears to form a separate group of the Niger-Congo stock. The Adamawa substock consists of a number of relatively little-known languages in east central Nigeria and the neighboring Cameroons. The Eastern substock extends north of the Bantu line in the Niger-Congo divide area as far east as the Republic of the Sudan (formerly Anglo-Egyptian Sudan). Important languages in this branch include Zande, Banda, and Sango, the last a wide-spread *lingua franca*.

The Niger-Congo languages are probably related to the Kordofanian languages, a far smaller group, spoken in some of the Nuba hills of Kordofan in the Republic of the Sudan.

Sudanic. The Sudanic languages are in general tonal. There are no divisions into noun classes, but some of the languages have a division into two sex genders. The nouns sometimes exhibit a system of cases. The verb in some of the languages has a complicated set of verbal derivatives. This family contains most of the languages spoken by Negroes not belonging to the Niger-Congo group.

Chari-Nile. The chief substock is that of the Chari-Nile languages (formerly called Macro-Sudanic). The Chari-Nile languages in turn have two major divisions, Eastern Sudanic and Central Sudanic, as well as a number of languages that must be classed separately. The Eastern Sudanic division includes the Nubian dialects of the Nile Valley and of the Kordofan plateau and Darfur to the west, and the Nilotic group: Western Nilotic (Shilluk, Dinka, Nuer, Lango), Eastern Nilotic (Masai, Bari, Turkana, Lotuho) and Southern Nilotic (Nandi-Suk). The last two are sometimes classed together as Nilo-Hamitic. The Central

Sudanic division includes Mangbetu of the former Belgian Congo and the Sara-Bagirmi languages of the Republic of Chad. A medieval Christian literature exists in Nile Nubian, the language being written in an alphabet derived from Coptic.

Saharan. Another important branch of Sudanic consists of the Saharan languages. Among these are Kanuri, the language of the aboriginal kingdom of Barnu near Lake Chad, and the Teda and Daza languages of the eastern Sahara.

The Maban languages of Wadai as well as Furian, the dominant language of Darfur, form further small branches of the Sudanic family. It seems probable that both Songhai, the language of the medieval Negro empire with its capital at Timbuktu, and the small Koman group of the Sudan-Ethiopian border areas are also Sudanic. In general, the Sudanic languages are distributed over a very extensive territory north and east of the Niger-Congo languages.

Click Languages. This family has three substocks. The largest is the Khoisan division of South Africa, which in turn falls into three groups: northern, central and southern. The Khoisan languages are spoken by the Bushmen and Hottentots; Hottentot belongs to the central branch of the Khoisan division. The other two divisions of the Click languages consist of the Sandawe and Hatsa languages of Tanganyika far to the north of the Khoisan substock.

These languages are characterized by the click sounds not found anywhere else in the world outside Africa, and confined here to these languages and a few Bantu languages which have borrowed them from Khoisan speakers. Sandawe and some of the central Khoisan languages, including Hottentot, have sex gender.

Other African Languages. In addition to the four major groups described here, the languages of the island of Madagascar are Malayo-Polynesian and distinct from those of the African mainland. Meroitic, formerly spoken near the confluence of the Blue

and White Nile, was written in an alphabet based on Egyptian hieroglyphs; we cannot connect it with any other language on present knowledge.

The European colonization of the last few centuries has resulted in one distinctly African language of European origin, Afrikaans, which has developed along distinctive lines from its Dutch origin so that it must be considered a separate language. English is the first language of the descendants of the Negro settlers from the United States who founded the Republic of Liberia. A creole language based on pidgin English is the language of Freetown in Sierra Leone founded by repatriated slaves in the nineteenth century.

Language, Race, and History. There is no necessary correlation between race and language, since a people can adopt the language of a different race or, on the other hand, retain their language in spite of thoroughgoing physical modification by another race. In Africa, as elsewhere, there is only an imperfect correlation between racial and linguistic classification. The strongest agreement is between the speakers of Click languages and the Bushman-Hottentot race. This only holds in full for the large Khoisan branch of the family. Even here, a Negroid group, the Bergdama, speaks a Hottentot language. The Pygmies apparently have no distinct language of their own but have adopted Niger-Congo or Sudanic modes of speech from their Negro neighbors. Otherwise these two families of language are spoken exclusively by racially Negroid people. Afroasiatic languages are spoken both by Caucasian and Negro peoples. The Cushites and Ethiopian Semites are often classed as Caucasoids. The Egyptians, Berbers, and remaining Semitic people are indisputably Caucasian while the Chad speakers are Negroid. On this evidence it seems probable that Afroasiatic languages were originally spoken by Caucasians and in some instances taken over by Negroes.

Several important conclusions can be reached regarding the history of Africa from the classification and distribution of languages. The large Bantu movement which eventually covered the southern third of Africa must have begun in relatively recent times, not much more than 2,000 years ago, from the area in which

the most closely related languages of the Benue-Niger substock are at present spoken in east central Nigeria. This is in accord with other types of evidence which show that this very large area was only recently occupied by Negroes, who were preceded by Pygmoid and Bushmanoid people. Another significant conclusion is that the Afroasiatic family must have originated in Africa, where all branches except Semitic are exclusively found. The Semites then must have migrated, probably at first to Arabia from East Africa, a movement later reversed by the Ethiopian Semites.

Much work remains to be done correlating details of African language distributions with archeological and documentary historical evidence. Likewise much can be done by the study of the distribution of specific words of culture-historical import, for example, terms for domestic plants and animals. Many terms have penetrated from the Mediterranean cultural area via the Sudan or the Nile to West and East Africa. Thus the Hausa word for 'gold', zinariya, is ultimately from Latin denarius, a gold coin, having reached Hausa via Berber. Again, Arabic influences correlate with the spread of Islam as a religion, while the effects of European contact have also left linguistic traces, for example, the Portuguese terms for the domestic pig and for manioc, the latter brought from South America.

Africa forces itself these days on the attention of even the least observant newspaper reader. Almost daily, accounts of nationalist demonstrations, the admission of newly independent States to the United Nations, and economic-development schemes demonstrate that Negro Africa is advancing with breathtaking rapidity from its traditional ways into the modern world. Where, one may ask, is the Africa of the travelogues, the villages in the forest clearing, the beat of the jungle drum, the medicine man with his dark doings, the warrior with spear and shield? Where, in short, are all the paraphernalia so dear to the heart of makers of grade-B films? One answer is that, of course, much if not all of this is still to be found, however modified by the tremendous impact of the Western way of life. Let the traveler but leave the beaten track and the bustle of modern Dakar, Lagos, or Léopoldville and he will, without difficulty, find much which conforms to the picture of the life he had thought of as typically African.

The traditional African way of life may be called the tribal way. In spite of vast diversity of custom, language, and race, the basic outlines of the tribal manner of living show everywhere a certain general similarity, particularly when we contrast it with the institutions of modern industrialism and nationalism. The tribe is a group of people inhabiting a common territory, speaking a common dialect or language, practicing similar customs, and bound by ties of real or fictitious common descent from a single ancestor. The African concept of the tribe is quite like that of the Bible, where such expressions as the children of Israel, for the Jews, or the children of Ammon, for the Ammonites, were intended in a quite literal way. The tribe is not necessarily a political unit in the sense of having formal governmental institutions, though many tribes in Africa have a headman or

king and a native bureaucratic system. There are in Africa south of the Sahara perhaps 1,000 tribes, and this figure is more likely to be an underestimate than an overestimate.

A glance at the past as we can now reconstruct it through the combined efforts of linguistics, archaeology, conventional history, physical anthropology, and other sciences will help us to understand the sources of this great diversity. Let us begin with race. We think of sub-Saharan Africa quite rightly as the Negro continent, for the vast majority of its inhabitants are Negro today, even after several centuries of European colonization. In addition, however, there are other groups, relatively small in number, who have been in Africa at least as long as the Negro, perhaps even longer. These include the Pygmies of the Congo forest, and the Bushmen and Hottentots of South Africa.

Of these, the Pygmies may be simply an offshoot of the Negro, with physical specialization in the direction of small stature, but the Bushmen and Hottentots with their characteristic sallow complexion, wrinkled skin, and peppercorn hair are fundamentally distinct from the Negro and must have a different origin. Could we go back in time but a short period as the million-year history of man is reckoned, the relative importance of these groups would appear very different from that which we find at present. Approximately 8,000 years ago there occurred a most significant advance in the development of mankind. This event was the first domestication of plants and animals. Its effect was truly revolutionary. Man was finally freed from his age-long dependence on the daily vicissitudes of a hunting existence. A sedentary life with a vast increase in population density leading to the formation of urban centers and centralized political organization became possible.

At the time that this first plant and animal domestication took place, all our evidence indicates that the Negro occupied West Africa and an extended belt of savannah country east of it and north of the Congo forest. The whole vast Southern part of the continent was occupied by Pygmies and Bushmen. The characteristic and beautiful cave paintings of the latter, reminiscent of the cave art of the Old Stone Age in Spain, have been found in East Africa far north of present

Bushman territory in South Africa. To complete the picture, Caucasians inhabited the Northern part of Africa, as at the present time. They probably even extended down into the Eastern horn of Africa, including Ethiopia and the Somalilands. When domesticated plants and animals began to spread into Africa from the Near East, it was naturally the Caucasians and the Negroes of the North, rather than the Pygmies and Bushmen to the South, who were in a position to take advantage of the new sources of food supply. Recent investigations raise the real possibility that the Negro independently domesticated certain food plants, notably sorghum, very widespread in Africa as a staple crop, where it is frequently called Guinea corn.

While the Negroes were moving into an agricultural or a mixed pastoral-agricultural economy, with a few groups such as the Masai of East Africa becoming exclusively pastoral peoples, the Pygmies and Bushmen maintained the hunting existence which has continued up to the present. The agricultural Negroes began naturally enough to expand and displace the hunting peoples. The last great wave of Negro expansion began perhaps about the time of Christ or a bit earlier. It brought the speakers of Bantu languages into the Congo basin and most of Eastern and Southern Africa. In fact, the southernmost Bantus such as the Zulus were still moving south and displacing the Bushmen at the time that the Dutch made their first settlements in South Africa in the 17th Century. The Bushmen were pushed into the inhospitable Kalahari Desert by this inexorable dual pressure.

The languages spoken in Africa reflect the history which has just been sketched. If we exclude the languages of the great island of Madagascar, which are Malayo-Polynesian and probably most closely connected with languages in Borneo in far-off Indonesia, then the great number of distinct African languages resolve themselves into four stocks of apparently distinct origin. Of these the Click or Khoisan languages are confined to the Bushmen, Hottentots, and a few small tribes of East Africa. The Click languages are so called because they possess a set of sounds, the clicks, which are not found as regular speech sounds in any other languages of the world except for some neighboring Bantu languages which have borrowed them. We sometimes make these sounds, though not as a regular part of our language. Thus the exclamation of commiseration written "tut! tut!" is the same

as the so-called dental click. The Pygmies presumably once had separate languages, but they now all speak languages of their various Negro neighbors. This is a reflection of the symbiotic relationship by which various Pygmy tribes are attached to Negro tribes with whom they exchange hunting for agricultural products.

There are two large families of languages which are spoken entirely by Negroes: the Niger-Congo family of West, South, and East Africa, which includes the great Bantu group as a branch, and the Sudanic family spoken across the Sudan, into the upper regions of the Nile, and in much of the Northern part of East Africa.

The other important family of languages spoken in Africa is the Hamito-Semitic group. These languages were no doubt originally spoken by Caucasians. The Semitic languages, which include Arabic and Hebrew, form one branch of this family. The now-extinct language of the ancient Egyptians formed another. There are several groups of languages of this family which are spoken by Negroes or by whites with strong Negro admixture. These include most of the inhabitants of Ethiopia and the Somalilands. Of the Semitic languages proper Arabic has spread widely in the Sudan and is sometimes spoken by people who are hardly to be distinguished racially from their Negro neighbors. So likewise the dominant groups of Ethiopia speak Semitic languages brought over the Red Sea from Southern Arabia some time before the Christian Era.

Language also mirrors more recent events in the history of Africa. The spread of Arabic already has been mentioned. In the Western Sudan, Arabs from North Africa established or continued an old caravan trade of vast extent. At a time when Europe knew almost nothing of the interior of Africa, vast empires flourished at the West African termini of these routes and Negro Moslem scholarship at the University of Timbuktu held an honored and prominent place in the Moslem world. In this way many Negro peoples became Moslem in both West and East Africa.

More recent events are likewise reflected in language. The language introduced by the Dutch settlers in South Africa is now so different from that spoken in The Netherlands that it ranks as a

separate language, Afrikaans. English is spoken by the descendants of the American Negroes who colonized Liberia. In East and South Africa, the Indian people who play such a large role in the commercial life of these countries still retain the languages they spoke in India. To this Babel of tongues we must, of course, add French, Portuguese, Spanish, Flemish, and finally English spoken by officials, businessmen, and, particularly in East Africa, permanent settlers of European origin.

Yet for all the lively diversity of race and language which we have been considering, the mass of Africans south of the Sahara outside of the burgeoning towns are still Negro agriculturalists. Indeed, much of the urban population consists of farmers who alternate between town and country, sometimes on a seasonal basis. Even those who live permanently in the cities are largely organized on tribal lines and retain their old loyalties and associations. For the tribal way of life is not only far from extinct but in many subtle and far-reaching ways it influences the present and no doubt will continue to have its effects in the future. This is particularly so with regard to what we may call the basic values of tribal life. For the tribe is not only an association of the living, in which an individual through extensive family and even wider clan bonds takes on a variety of social rights and responsibilities and finds his station in life. It includes the dead as well. In traditional African belief, the ancestral spirits are ever present, approving an individual's virtues and successes and punishing him when he goes astray.

A farmer's most important resource is the land, and the land belongs to the corporate group of past and former kinsmen or fellow clan members which assigns him what he needs. He but holds it in trust while he is alive. This religious attitude toward the land and ancestors and the sense of solidarity toward his fellow tribesmen are perhaps the chief values inculcated by life in the tribe. No one starves while a relative can provide for him. No one stands alone in a dispute as long as he has family and clan members at his side. These attitudes survive even when the African becomes a Moslem or a Christian or lives in a city. The tribe often becomes the basis of political associations and parties, as in the Congo and elsewhere at the present time.

For a people cannot entirely and immediately break with its past, even were this desirable, and if anything can be said to be certain about the institutions of the newly emergent Africa, it is this: they will not be mere carbon copies of imported Western institutions; the traditional African values inherited from tribal days will enter as a far-from-negligible factor into the institutions of the Africa of tomorrow.

Memorandum Concerning Language Universals

In Collaboration with Charles E. Osgood
and James J. Jenkins

I. Introduction

Underlying the endless and fascinating idiosyncrasies of the world's languages there are uniformities of universal scope. Amidst infinite diversity, all languages are, as it were, cut from the same pattern. Some interlinguistic similarities and identities have been formalized, others not, but working linguists are in many cases aware of them in some sense and use them as guides in their analyses of new languages. This is an important but limited and incomplete use of these consistencies. Language universals are by their very nature summary statements about characteristics or tendencies shared by all human speakers. As such they constitute the most general laws of a science of linguistics (as contrasted with a method and a set of specific descriptive results). Further, since language is at once both an aspect of individual behavior and an aspect of human culture, its universals provide both the major point of contact with underlying psychological principles (psycholinguistics) and the major source of implications for human culture in general (ethnolinguistics).

It is our belief that coordinated efforts beyond the scope of individual researchers will be necessary to establish on firm grounds the actual facts concerning universals in language. Thus, the illustrations cited later in this Memorandum must be taken cum grano salis as based on the specific knowledge of the writers which, however wide it might be, could not in the nature of things be exhaustive. Organization of some central source of data, something like a cross-cultural file for a large and representative sample of world languages,

would vastly facilitate the establishment of well-grounded universals and their continued study by scholars. As a first step, it is proposed that the Committee on Linguistics and Psychology of the Social Science Research Council arrange for a Work Conference on Language Universals. This Memorandum, which has grown out of discussions held at the Center for Advanced Study in the Behavioral Sciences during 1958-1959, is offered to stimulate activity leading to such a conference and to suggest the kinds of topics which might appropriately be discussed.

2. Examples of Universals

Before going further, it is perhaps wise to describe a few examples of language universals which will illustrate some of the scope and diversity involved in the types of similarities seen between language systems.

First, we may take an example from phonology. The phonemes, or individual sound units, may be looked upon as consisting of the simultaneous occurrence of several elements called features. For example, in English the phoneme /b/ is characterized by voicing, stop articulation (that is, it involves a complete closure as contrasted with various types of fricatives), and it is oral, that is, nonnasal. There is another phoneme /p/ in English which shares all of these characteristics except voicing. In general, the features of a particular phoneme are not unique and the entire set consists of varying combinations of the same small inventory of features. More often than not, there is a parallelism or symmetry in the combinations observed. This leads to certain expectations on the part of the investigator. For example, in the investigation of a hitherto unstudied language in Nigeria, a phonemic contrast was found between the two velar stop consonants /k/ and /k'/, the former unglottalized and the latter glottalized, as well as a pair of dentals /t/ and /t'/ . Since the third unvoiced stop consonant /p/ was also found, the linguist at this point formed the hypothesis that a glottalized counterpart /p'/ was also likely

to occur even though it had not yet appeared in a fairly considerable body of linguistic material. Ultimately it was found to occur in a very small number of words. This expectation might, of course, have been disappointed, but investigators do form such hypotheses and find that the alertness engendered pays off in a majority of cases.

The tendency toward symmetry in the sound system of languages described here has, of course, psycholinguistic implications. The articulatory habits of speakers involved in the production of the phonemes consist of varied combinations of certain basic habits, those employed in the production of the features. This appears, for example, in language acquisition by the child. At the point in the development of the English-speaking child that he acquires the distinction between b and p based on voicing versus nonvoicing, he simultaneously makes the distinctions between d and t, g and k, and other similar pairs. In other words, he has acquired the feature, voicing versus nonvoicing, as a unit habit of motor differentiation. Such facts have an obvious importance for learning theory in psychology.

A quite different sort of universal may also be illustrated within the domain of phonology. As stated earlier, distinctive features are combined to generate the phonemes employed in any given language. It is of some linguistic interest and great psycholinguistic interest to examine the relation between the number of distinctive features required to generate the number of different phonemes employed by the language and the number of distinctive features actually in use. A maximally efficient code, in the information theory sense, would employ just the number of features necessary to distinguish its phonemes, for example, the 32 phonemes of English would require only five distinctive binary features (that is, the features could be combined in two to the fifth power different combinations, or 32 combinations). However, in English nine binary features are actually employed. The efficiency of English in respect to phonology is therefore about five ninths, or 56%. Investigation of several languages suggests the generalization that the phonetic

efficiency of languages is distributed roughly around the 50% point. A study of one language (Spanish) as it has changed over time reinforces this generalization by revealing that the efficiency of that language oscillates around the 50% value over time.

It appears that there are sets of pressures bearing on any phonetic system which cause it to maintain some optimal efficiency value. If the language becomes too inefficient, that is, has too many features overdetermining the phonemes, it becomes possible to neglect some of them and still be understood. We presume that such lapses become more frequent and the sound system begins to change toward simplicity. On the other hand, if the system is too efficient, mishearing and misperceptions should become frequent, and we assume that the speakers are led (or driven) to make additional distinctions to maintain clarity. It is obvious that this "explanation" generates a complex statistical function, but one that presumably reflects universal processes in the total dynamics of communication between speakers and listeners.

3. The Nature of Universals

The examples just cited illustrate that the term universal is used here in a somewhat extended sense. We have not limited ourselves to statements of the type that all languages have vowels; all languages have phonemes; all language sound systems may be resolved into distinctive features, etc. We feel that it is important to include generalizations which tend to hold true in more than a chance number of comparisons (such as symmetry of sound systems) or which state tendencies to approach statistical limits across languages or in one language over time. We are convinced that the wider use of this concept will prove to be most fruitful from the psycholinguistic viewpoint. All phenomena which occur with significantly more than chance frequency in languages in general are of potential psychological interest.

With this expanded view of universals, confusion may be most easily avoided by pointing out that types of universals may be

differentiated both with respect to logical structure and with respect to substantive content.

4. Logical Structure of Universals

From a strictly logical point of view, it is possible to define universals as any statements about language which include all languages in their scope, technically all statements of the form " $(\underline{x}) \underline{x} \in L \supset \dots$," that is, "For all \underline{x} , if \underline{x} is a language, then \dots ". These statements fall into various logical subtypes. Such an analysis is useful since in addition to specifying clearly what is to be considered a universal, the distinct subtypes do to some extent present distinguishably different problems from other points of view. We have considered and will present here six types of universals. The first three may be considered as universals which concern existence (that is, " \underline{X} does or does not exist") and the last three as universals which concern probabilities (that is, " \underline{X} (or some value of \underline{X}) is more probable than \underline{Y} (or some other value of \underline{X})").

4.1. Unrestricted universals

These are characteristics possessed by all languages which are not merely definitional; that is, they are such that if a symbolic system did not possess them, we would still call it a language. Under this heading would be included not only such obvious universals as, for example, that all languages have vowels, but also those involving numerical limits, for example, that for all languages the number of phonemes is not fewer than 10 or more than 70, or that every language has at least two vowels. Also included are universally valid statements about the relative text or lexicon frequency of linguistic elements.

4.2. Universal implications

These always involve the relationship between two characteristics. It is asserted universally that if a language has a certain characteristic, (ϕ), it also has some other particular characteris-

tic (ψ), but not vice versa. That is, the presence of the second (ψ) does not imply the presence of the first (ϕ). For example, if a language has a category of dual, it also has a category of plural but not necessarily vice versa. Hereafter we express such relationships between predicates by an arrow, for example, dual \rightarrow plural. Such implications are fairly numerous, particularly in the phonologic aspect of languages.

4.3. Restricted equivalence

This is the case of mutual implication between characteristics which are not universal. That is, if any language has a particular nonuniversal characteristic, ϕ , it also has ψ and vice versa. For example, if a language has a lateral click, it always has a dental click and vice versa. In this example, unfortunately, all the languages are from a restricted area in South Africa, and the equivalence is really a single case. Equivalences of more frequently appearing logically independent characteristics are difficult to find. They would be of great interest as indicating important necessary connections between empirically diverse properties of language.

4.4. Statistical universals

These are defined as follows: For any language a certain characteristic (ϕ) has a greater probability than some other (frequently its own negative). This includes "near universals" in extreme cases. Only Quileute and a few neighboring Salishan languages among all the languages of the world lack nasal consonants. Hence we may say that, universally, the probability of a language having at least one nasal consonant (ϕ) is greater (in this instance far greater) than that it will lack nasal consonants (not ϕ). We may extend this type to include cases of more than one alternative. For example, of the three devices of suffixing, prefixing, and infixing, the probabilities are not random and in fact are here stated in decreasing order. In this case the alternatives are not mutually exclusive, for example, a language can have both prefixes and suffixes.

4.5. Statistical correlations

This differs from the preceding in a manner parallel to that in which universal implications differ from unrestricted universals. In this instance also we are interested in the relation of several characteristics. By a statistical correlation we mean, then, that universally, if a language has a particular characteristic (φ) it has a significantly greater probability of possessing some other characteristic (ψ) than if it does not possess (φ).

The following is a probable example. Languages with gender distinctions in the second person singular are rarer than in the third person. Usually a language with gender distinction in the second person singular also has this distinction in the third person singular but not vice versa. If this were without exception, we would have the implication: Second person singular pronominal gender \rightarrow third person singular pronominal gender. There are apparently, however, a few languages in central Nigeria which have the distinction in the second person, but not in the third. The proviso here is that these languages have not been well studied. If the exceptions are genuine, then we have the following statistical correlation: If a language has pronominal gender in the second person singular, it has a greater probability (much greater in this case) of having this distinction in the third person singular than of not having it.

4.6. Universal frequency distributions

Finally we have instances where a certain measurement, for example, redundancy in information theory, as mentioned earlier, may be applied to any language. When this is so, it is possible that the results of each measurement over an adequate sample of languages will show a characteristic mean and standard deviation. Means, standard deviations, or other statistical measures derived from such distributions may be considered as universal facts about languages.

5. Substantive Classes of Universals

A second basis of classification which obviously crosscuts the division by logical type is that which operates with the aspect of language involved. While a variety of alternative categories is possible, in general, this principle of division will give us four types: phonological, grammatical, semantic, and symbolic. In this classification, the first three involve either form without meaning or meaning without form, whereas the last, which is concerned with sound symbolism, involves the connection between the two. For example, the near universality of nasals is a phonologic universal in whose statement we are not concerned with the meanings of the linguistic forms in which the nasals do or do not figure. The grammatical statement that suffixing is more frequent than infixing is not concerned, on the other hand, with the particular sounds utilized in suffixing. Again, the semantic universal that all languages have some metaphorically transferred meanings is not concerned with the particular sounds of the forms in which they occur. On the other hand, a statistical symbolic universal such as "there is a high probability that a word designating the female parent will have a nasal consonant" involves both sound and meaning.

6. Domain of the Universals

All the examples thus far cited in this Memorandum have been synchronic; that is, the statements refer to universally discoverable regularities arrived at by observing the characteristics of language states rather than of language changes. The definition of universals, moreover, and the further classifications of their occurrence into phonologic, grammatical, semantic, and symbolic have all been framed with a view to synchronic universals. However, we feel it is essential to extend the consideration of universals to diachronic facts of language. From the present point of view, it would be unwise to exclude these from consideration, in spite of the important differences to be noted, since universals of change have important psycholinguistic implications. From the general

linguistic point of view, some universals are most easily understood as the outcome of dynamic processes, for example, semantic metaphor as the result of metaphorical semantic change, or again the universal, or almost universal, existence of variant forms of meaningful units (that is, morphophonemic alterations) as the result of the diachronic process of regular conditioned sound change. From the psychological point of view, such universals may serve to focus attention on phenomena, which may be brought under experimental control in the laboratory for study (e.g., the historical instability of liquids and nasals suggests both articulatory and auditory studies of interest in motor skills and perception).

Diachronic universals do differ in several fundamental ways in regard to bases of classification mentioned earlier. To begin with, although there are important universal hypotheses concerning change such as "all languages change" or "the rate of replacement of fundamental vocabulary is constant over time," the particular substantive diachronic universals are probabilistic. We can never say with certainty that a particular class of changes will always occur. The varied development for distinct but related languages from the same basis is enough to show this. Further, the logical form for universals presented earlier requires significant modification. Whereas for synchronic universals we always start with "For all x if x is a language (i.e., a single synchronic state), then . . .," in the case of diachronic rules the reference to two synchronic states is essentially with the further proviso that one is the historical continuation of the other. It is common usage to say that these are the same language unless the chronological distance is great, that is, Latin and French. Logically, then, diachronic universals are of the form "For all (x) and all (y) where (x) is an earlier and (y) a later stage of the same language. . .". Further, for diachronic change, the division into phonologic, semantic, and grammatical processes holds, but symbolism is not a type of change, although changes can result in forms which are more or less similar to universal sound symbolic norms.

Synchronic and diachronic regularities are obviously interrelated. The most general statement of this interrelationship is in the

form of limitations, namely, that no synchronic state can exist which is not the outcome of possible diachronic processes (except perhaps de novo for artificial and pidgin languages) and no diachronic process posited which could lead to a synchronic state which violates a universally valid synchronic norm. It is important to note that, just as was indicated earlier that some synchronic universals are most easily understood as the outcomes of certain widespread processes, so specific diachronic changes cannot be understood without reference to the network of synchronic relations within the language at the time of the change. This is the basic contribution of structural linguistics to the study of linguistic change. Diachronic universals are probabilistic precisely because simultaneously with the universal tendencies toward changes of one kind as against other possibilities there are significant variables in the language structure itself, and every language structure is unique in some way.

An example of a diachronic process with important psychological implications is the tendency found in the most diverse languages for unvoiced consonants between vowels to become voiced. The psychologist has a background of experimental data dealing with the processes of anticipation (performing an act or portion of an act before it is wholly appropriate) and perseveration (continuing a behavioral element beyond the time it is wholly appropriate). He expects adjacent phonemes to influence one another — the commonly observed phenomenon of conditioned allophonic variation. Given a sequence of vowel, consonant, vowel he must predict on the grounds of both anticipation and perseveration that there will be a strong tendency for the consonant to be voiced rather than unvoiced since both the preceding and following elements are voiced. The psychologist would select the vowel-unvoiced consonant-vowel sequence as a "weak" spot in the language and one where change is more likely than either consonant-vowel or vowel-consonant alone. This prediction, of course, has two aspects: first, that diachronically unvoiced consonants between vowels will tend to become voiced and, second (all other things being equal), in a language at any given time there will tend to be more vowel-voiced consonant-vowel combinations than vowel-unvoiced consonant-vowel combinations. The verification of these findings also suggests to the psycholinguist methods for working with the phenomena of anticipation and perseveration of sound pattern in the laboratory setting.

4. Interrelations of Language Universals

In addition to its importance for the interdisciplinary field of psycholinguistics and psychology proper, this study of language universals is intimately connected with the establishment of scientific laws in the linguistic aspects of human behavior. It is thus of general significance for the development of the behavioral sciences. The study of universals leads to a whole series of empirical generalizations about language behavior, some as yet tentative, some well established. These are the potential material for a deductive structure of scientific laws. Some, indeed, probably most, of these have the status of empirical generalizations which cannot at our present state of knowledge be related to other generalizations or deduced from laws of more general import. For example, it seems well established that every language has syllables of the form CV (consonant followed by vowel) in addition to whatever other type it may possess. We cannot say why this should be so, on the basis of general laws of wider scope. For this reason it has a certain fragility. We would be quite astonished if someone discovered a language which did not have this kind of syllable, but we cannot give any reason why this should not be found.

It is clear, however, that some universals having to do with the same aspect of language are interconnected. For example, we have chains of implications in this very area of syllabic structure.

Thus $CCCV \rightarrow CCV \rightarrow CV$, where V may in any case be preceded by sequences of C, and $VCCC \rightarrow VCC \rightarrow VC \rightarrow V$, where V may be followed by sequences of C. In this instance we can deduce all of these from the general statement that if syllables containing sequences of \underline{n} consonants in a language are to be found as syllabic types, then sequences of $\underline{n} - 1$ consonants are also to be found in the corresponding position (prevocalic or postvocalic) except that $CV \rightarrow V$ does not hold. The possibility of deducing these five universal implications (and it probably holds for still larger consonantal sequences) gives a degree of certitude to the individual statements that they would not otherwise possess.

General statements of this kind may be called internal since

they contain predicates of the same kind as the individual universals that they explain. In other cases, we have external deductions, as in some of the examples discussed earlier, where psychological principles are adduced which do not specifically involve linguistic predicates and which serve as explanatory principles for a much wider variety of phenomena, for example, the behavior of rats in mazes. These wider principles need not always be psychological in the narrower sense. For example, they may be cultural with a social-psychological aspect as when we consider the prestige and power relations of two linguistic communities as a variable in accounting for tendencies of universal scope involving the effects of one language on another.

8. Present Needs

The importance of the study of language universals to both the burgeoning field of psycholinguistics and the development of linguistics as a behavioral science has, we believe, been sufficiently indicated. It has been further suggested that important consequences for several others of the behavioral sciences may be involved. It remains to be considered whether coordinated efforts outside the scope of the individual researchers can be useful for the development of this area of study. The first step methodologically is obviously to establish on firm grounds the actual facts concerning the universals of language. For some of the more elaborate hypotheses concerning, for example, semantic universals, it is clear that there is no substitute for special individual research projects aimed at particular problems and involving fieldwork (see, for example, the Southwest Project in Comparative Psycholinguistics). For many types of universals, however, particularly synchronic phonologic and grammatical universals, the organization of something of the order of cross-cultural files for a large sample of languages would vastly facilitate the establishment of factually well-grounded universals concerning language. The area of sound symbolism might be selectively indexed since an exhaustive body of data would obviously include all the morphemes of all the languages of the world.

Such a project would obviously require careful planning. The categories to be selected, the manner of selecting, recording, and indexing the data, the question as to how the results could be made available generally to interested scholars, problems of organization and financial support would all have to be considered. It is, therefore, suggested that a work conference on the subject of language universals be organized to include linguists, psychologists, and anthropologists interested in this area under the sponsorship of the Council in order to consider both the theoretical problems of universals and the possible organization of such a project as that mentioned earlier. In addition to the specific problems of such a project, such a meeting might well stimulate individual scholars in carrying on their research in this area.

NOTE

This memorandum was presented to the Conference on Language Universals, Gould House, Dobbs Ferry, N.Y., April 13-15, 1961.

Language is unique to man. No other species possesses a truly symbolic means of communication and no human society, however simple its material culture, lacks the basic human heritage of a well developed language. Language is the prerequisite for the accumulation and transmission of other cultural traits. Such fundamental aspects of human society as organized political life, legal systems, religion and science are inconceivable without that most basic and human of tools, a linguistic system of communication. Language is not only a necessary condition for culture, it is itself a part of culture. It, like other shared behavioral norms, is acquired by the individual as a member of a particular social group through a complex process of learning. Like other aspects of human culture, it characteristically varies from group to group and undergoes significant modification in the course of its transmission through time within the same society.

It might have been thought self-evident that linguistics, the science which deals with this most characteristically human of traits, would always and indisputably have been considered a social science. Yet in the mid-nineteenth century, August Schleicher, a linguist of eminence (and, of course, he was not alone in this) declared linguistics to be a Naturwissenschaft rather than Geisteswissenschaft. More specifically, he conceived of language as an organism and of linguistics consequently as a biological science.

This view of course has long been abandoned. Yet it is worth asking why a thesis which to one generation is obviously false could have been seriously entertained and in some cases adopted by highly intelligent men, among the leaders in their science. For the grounds of this belief, some explicitly stated, some implicitly assumed, must be symptomatic of the state of the science itself and likely to leave traces in the thinking of succeeding generations of scholars.

We ask then why the view that linguistics was a natural science, and more specifically a biological science in a literal and not merely analogical fashion, should once have proved so attractive. A brief glance at the history of linguistic science will prove illuminating. Linguistics is, with the possible exception of economics, the most precocious of the behavioral sciences. The historic or comparative branch of the subject, which was the first to become prominent, achieved remarkable successes in the early part of the nineteenth century. The discovery that the vast majority of the peoples of Europe and western Asia spoke related languages derived from a common ancestral form was followed by the successful reconstruction of many of the phonetic and grammatical features of the Indo-European parent speech. This achievement threw a flood of light upon periods before the beginning of written history and stirred the historical imagination of educated men in the nineteenth century far beyond the confines of professional linguistics.

A further incidental aspect of this development impressed some thoughtful individuals as, perhaps, of even greater ultimate significance than the specific historical results. This was the discovery of so-called "sound laws," that is, that under given phonetic circumstances, a particular sound changed regularly to some other sound. The most celebrated instance was that according to which certain sound-changes occurred in the course of development of the ancestral Germanic tongue from the earlier common Indo-European and which became known as Grimm's Law. It was, indeed, striking that in this apparently trivial aspect of human behavior in which no one had suspected that there was any orderly principle, such regularity should exist. Kroeber, the eminent anthropologist, once remarked in conversation that in moments of discouragement regarding the prospects of the scientific study of human behavior he took comfort in thinking of Grimm's Law.

A consideration of some aspects of this law will show, however, why, viewed in a certain light, it and similar phenomena might lead quite naturally to the view of language as a completely self-contained structure with laws of its own quite detached from consideration of the other aspects of its speakers' behavior. For example, according to Grimm's Law, an original consonant t, which

did not change for example in classical Latin, would be changed to th in Germanic where, in English at least, it has continued essentially unmodified to the present time. Thus th in English three corresponds to the Latin t in tres with the same meaning, or again, English thunder is cognate with Latin tonare 'to thunder.' In some cases it appears as though we have an exception. For example, English stand, German stehen shows a t against Latin stare 'to stand' instead of the expected th. However, in this and other examples the t is preceded by s. Therefore the law must be qualified by the statements that Proto-Indo-European t changes to Germanic th when not preceded by s, but remains when preceded by s. Note that these and other qualifications that might have been mentioned are likewise stated in terms of sounds. The meanings and grammatical functions of the words in which the changes occur seem irrelevant to the operation of the law.

It is this apparently self-contained nature of the linguistic domain exemplified in this historically important case that leads, even after the rejection of the notion of language as a quasi-organism developing according to its own internal laws, to the demand that language be studied autonomously and that linguistic phenomena be explained only by reference to other linguistic phenomena.

This view of language as an autonomous domain with its own immanent laws widely held by linguists has indeed proved to be up to now a valuable methodological rule. It may be viewed as an exhortation to cultivate one's own garden first and as a standing warning against the facile employment of principles of explanations based on a superficial knowledge of other sciences such as psychology which, in the view of many linguists, is less well-developed scientifically than linguistics itself and so, far from being able to aid in the solution of linguistic problems, stands rather in need of help itself.

It is possible, however, that an outside observer, interested in language as a general human phenomenon, for example, in the wider contexts of psychology of language, the role of language in communication, in the relation of language to other aspects of

human cultural behavior, and being unaware of the outstanding success of linguistic science in its own circumscribed domain might, on glancing at the titles of articles in a professional linguistic journal, remark, paraphrasing the well-known remark of Clemenceau about generals and war, that language was much too important a matter to be left to linguists.

As a matter of fact, in the United States as elsewhere the tendency to see linguistic problems in these varied and wider contexts has developed alongside of and supplementary to an entirely legitimate continuation of traditional linguistic concerns.

In one respect, at least, a broader approach to linguistic problems is well established in the American scientific scene. Because of the basic role of language in making other cultural behavior possible, earlier alluded to, and because it is itself a most important aspect of culture, linguistics can, from one point of view, be considered not only a behavioral science, but specifically a specialized subsience within that branch of anthropology which considers human cultural as distinct from physical traits, namely, cultural anthropology. This view is reflected in American academic organization. Every major department of anthropology in the United States offers courses in general linguistics, considers linguistics a basic branch of anthropology and usually has a professionally trained linguist on its staff. Historically considered, this situation is chiefly due to the influence of the late Franz Boas, doubtless the key figure in the development of anthropology in the United States. In the extensive investigations of American Indian peoples which he sponsored and in part carried out himself, he found it indispensable to include the scientific study of their languages. This field had been relatively neglected by the more traditionally oriented linguists of the period who were chiefly interested in the languages of people who had left written records of historical value or a literature worthy of study and humanistic appreciation.

The close integration of linguistics with general anthropology in the United States does not of course mean that linguistics

cannot be and is not pursued from other points of view. Indeed the majority of linguists in the United States are not affiliated with anthropology departments. However it will be evident when some of the specific lines of this inquiry and substantive contributions of American linguists are considered, that to a considerable degree, the most pervasive characteristics of linguistic science in the United States owe their ultimate origin to this intimate connection with anthropology.

Linguistics as traditionally practiced has two main branches: descriptive linguistics, whose task it is to study languages as functioning systems in a single community at a single time, and historical linguistics, which investigates languages under their dynamic aspect of change through time. Thus a grammar of English as spoken about 1800 would fall within the province of descriptive linguistics, while a comparative study of the changes undergone by the various Romance languages in their development from Latin would belong to the historical subdivision of the subject. It was only from about 1920 onwards that such questions as the nature of the categories employed in describing language, and the requirements to be met for a scientifically adequate grammar ceased to be taken more or less for granted and became a center of theoretic interest. A number of approaches emerged both in Europe and the United States at about this time which have been called structural. While not denying the validity and importance of historical considerations, all have in common an interest in interrelationships within a language as a structure functioning on a single time plane. The problem of describing American Indian languages, highly varied among themselves and differing greatly in type from the Indo-European and other languages of Europe and neighboring areas, raised in a particularly acute form the question of the nature and the universal validity of grammatical categories. For example, the traditional parts of speech based on Latin grammar had hitherto been employed in more or less modified form in describing the grammatical structure of all languages.

The difficulties of the traditional method, which is based on semantic definitions presumed to reflect universally necessary

categories of thought, may be illustrated in the instance of adjectives. In school grammars adjectives are defined as words which designate qualities of substances, for example, 'green,' 'large' and so on. But in many languages of the world, not only American Indian languages, such concepts are frequently expressed by formal means which are in some cases identical with those used to express actions and other ideas which are semantically characteristic of what are commonly called verbs. In such a language the sentence 'the leaf is green' would be literally translated as something like 'the leaf greens.' To put those members of the formal class which translate as action words in our language into one grammatical class and call them verbs and others which translate adjectives into another grammatical class, is an imposition of categories derived a priori to a situation in which they do not apply. It will lead to inefficient grammars which, from the point of view of the language itself, arbitrarily group things together which are separate and separate things which belong together.

The treatment of this problem has tended therefore towards the setting up of categories in a purely formal rather than semantic basis. As a matter of method, meanings are disregarded, and those forms which function similarly in that one can substitute for the other and produce a grammatically possible utterance, or exhibit other formal features in common such as similar inflections, are put in the same class. Thus boy and man are members of the same class because one can substitute for the other while still producing grammatical sentences rather than because, in the traditional terminology, they stand for 'a person, place or thing.'

This view of grammar leads squarely to the notion of a language as a calculus, that is, a structure to be described by a mathematics having to do with classes or sets of elements, their membership and their relations of sequencing and combination. Such a mathematics is nonquantitative since it is not concerned with the numbers of elements involved but rather with their relational structure. From this point of view linguistics might be considered part of a wider subject-matter, semiotics or the study of sign systems in general. For example, the formulas of mathematics or symbolic logic seem to display a certain analogy with

language. From a limited number of elementary symbols, sequences of finite length are constructed according to certain rules which might be called the "grammar" of the system. Thus it is part of the grammar of mathematics that an open parenthesis must sooner or later be followed by a closed parenthesis, just as it is part of English grammar that an adjective preceded by the article must ultimately be followed by a noun.

Semiotics, the general study of such systems, is not a subject matter or discipline in the academic sense but rather a common interest still very much in its infancy, developed in common among others by logicians, linguists and communication engineers. This development, which in the case of linguistics has perhaps gone farther in the United States than elsewhere, is remarkably parallel to the formalization of logic although most probably without historical connection with it. For in logic, the notion of implication, that is, that one statement follows from or is the logical consequence of another, came to be looked upon among certain logicians as not primarily resulting from the meaning of the statements. The rules of logical deduction are then formulated as a set of transformations following certain rules operating on a string of symbols without regard to their meaning.

This tendency towards formalization which has the twofold advantage of overcoming the bias inherent in an a priori semantic classification and in allowing the application of nonmetric mathematical methods, calls for certain further general observations. Reverting to the specific example of the traditional parts of speech treated earlier, we see that for further development of linguistics it is necessary to transcend its status as a merely descriptive science which produces grammars adequate to the idiosyncratic structure of each language described. For such a method, whose validity as a technique for the description of individual languages is not here in question, would tend to overlook the great similarities which do in fact exist among all languages. Such similarities are a reflection of the basic biological unity of man as a behavioral animal and the fundamental similarity of the functional task that a communicative system must perform in any society. Thus were we to follow to its ultimate consequences the logic of the formal approach, we would

divorce ourselves completely from the traditional terminology of grammatical analysis and instead of noun, verb, adjective and the like, talk about classes A, B, C, etc. for each individual language. Since such designations would be quite arbitrary, the affixing of the same label A to grammatical classes in different languages would not equate them as we do tacitly in the traditional approach when we call a certain class of words nouns, for example, both in English and Turkish. The lack of comparability would disguise the fact that there are important correlations and similarities among languages reflecting the common factors mentioned earlier. So, although we would quite rightly decide upon the specific membership and the number of classes by rigorous combinatorial methods, we still must note that a particular class of words involves notions which from the semantic point of view exhibit a general similarity to classes in other languages. Such similarities are in some cases of universal scope and occur in all languages. Thus, although details will differ, a class corresponding to nouns and another distinct class corresponding to verbs and their combination to express a proposition is found everywhere; as so often we return again on a higher level to an apparently abandoned viewpoint, namely that of a universally valid set of general concepts embodied in language and reflecting the universal requirements of human thought. But now instead of imposing such a scheme a priori and based on the single arbitrarily selected pattern of Latin grammar, we arrive at it by inductive comparisons of results obtained from the most diverse languages and by a rigorous methodology. It should be stated, of course, that what is sketched here as the last step is at present a program and direction of development rather than in any sense a fully formulated set of results. It is evident though that the promise of such conclusions is of the highest importance for general psychology as showing what features of human thinking are universal and necessary and what are transient and accidental.

What might be termed the calculus approach to language calls, perhaps, for still one more comment. The role of meaning in contemporary linguistics has been the subject of much discussion and controversy. It should be emphasized that several distinct questions are involved. The rejection of semantic criteria as defining properties for grammatical class does not necessarily involve the rejection of meaning itself as a proper subject for linguistic

science. In fact, it cannot be avoided if linguistic descriptions of individual languages are to have any practical or scientific usefulness. The prominence of formal methods in grammatical analysis in the United States should not lead to the mistaken view, as it sometimes has done, that the semantic aspect of language is being rejected as part of linguistic science.

Turning to the historical branch of linguistic science, its most characteristic achievement, as has been noted, is the reconstruction with a high degree of plausibility of many features of extinct languages through intensive and careful comparison of the descendant languages. It has been widely thought that success in this enterprise is only possible where, as for Indo-European and Semitic languages, there are written documents which can help us by giving direct evidence of the earlier periods of the languages being compared. However, a precisely similar method has been applied with success to the comparison of languages without earlier written records, for example, the Bantu languages of Africa and the Malayo-Polynesian languages of the Pacific. Here again in the United States, the intimate tie with anthropology asserts itself. The archeologist and historically oriented ethnologist seeks to integrate the results of his own work with that of comparative linguists in the American Indian and other fields and to profit by the contributions which linguists can make in this area, a contribution which becomes all the more important where early written records are very nearly absent.

The most important desideratum in coordinating such results has been a means of dating the period at which earlier extinct languages have been spoken by an absolute rather than a mere relative chronology. In recent years a method has emerged in the United States associated chiefly with the names of Swadesh and Leese which promises for the first time to furnish such an absolute time scale for linguistic reconstructions. Although there are still important difficulties to be overcome, the method has already been applied to problems of prehistory with some success.

The basic notion is that if we compare related languages, certain elements of vocabulary are extremely stable in that they

are not easily replaced by borrowed words from a foreign language, such as terms for low numerals, parts of the human body, fire, water, etc. The more closely languages are related, the more of those related elements they still have in common. For example, English and German, being more closely related to each other than either is to French, have more such related terms in common. For example, the word for 'arm' in German is 'Arm' but French has the unrelated form 'bras.' The percentage of such terms held in common by two languages is thus a measure of the remoteness of their relationship, that is, of the period of time elapsed since they were once the same language. The assumption is that over a given period of time a certain proportion of the terms of a standard list of 100 will be replaced. This is still a relative chronology. However, the replacement rate in terms of absolute time has been established empirically by considering languages for which there are written records over a considerable time span. The most recent determination of this rate gives the result that a language will retain approximately eighty-six per cent of this list in a thousand years with an error of six and one half per cent at the five per cent confidence level.

Glottochronology may be considered to have developed to a certain extent as a method which is of interdisciplinary interest since it concerns archeologists and cultural historians as well as linguists. This interdisciplinary aspect is important in a number of other relatively recent developments in linguistics, of which time will permit only brief mention.

The study of acoustics of speech sounds, which may be considered a border area between linguistics and physics, has made important advances in the last decade or so, largely through the invention of the sound spectrograph which permits a very exact study of the acoustic characteristic of speech sounds. This invention was developed in the Bell Laboratories growing out of a general interest in communication and as a specific aid in teaching deaf-mutes to speak. The subsequent invention of a speech synthesizer by which sounds are produced from hand-painted spectrograms allows manipulation of features of the sound waves which can be systematically studied. This line of experimentation, which is obviously of great

importance for the general psychology of perception, has already produced interesting and significant results. It has been discovered for example that a basic cue for distinguishing one stop consonant from another is the direction and size of transition to or from the main resonance frequencies of the vowel which precedes or follows, rather than in the consonant itself.

Finally, to mention but one more characteristic area of interest, in the relatively unexplored area between language and other aspects of culture, known as ethnolinguistics, and that between linguistics and psychology, known as psycholinguistics, the sharpest issues have been raised through the largely posthumous interest in the writings of Benjamin Lee Whorf. The basic viewpoint of this writer, often called Whorfianism or linguistic relativity, is one which has strong parallels in certain European writings on the subject. The general notion is that the grammatical categories of a language determine or at least influence strongly the general manner of conceiving the world of those who speak it. This general thesis has given rise to much theoretical discussion. An extensive program of research involving monolingual and multilingual speakers of Hopi, Navaho, Zuni, Spanish and English in the Southwestern part of the United States was begun in 1954. The basic design of the studies has been to test limited and specific aspects of the general Whorfian thesis by administering the same psycholinguistic tests on speakers of the different languages. In such studies the speaker's language is intended to be the only independent variable. As yet only partial results have been published. An examination of these data as well as the unpublished materials of the project points to the overall conclusion that agreement in fundamentals of human behavior among speakers of radically diverse languages far outweighs the idiosyncratic differences to be expected from a radical theory of linguistic relativity.

Linguistics is at the moment in a phase of vigorous expansion in the United States. The realization is gradually gaining ground that linguistics is a behavioral science and one of basic importance. Beyond the study of specific languages as tools of

research and communication, there is the science of language in general which studies a phenomenon so basic to human cultural, social and individual behavior that no adequate body of theory having to do with behavior in general is ever likely to emerge without a consideration of the key role of language in its interrelations with other aspects of this behavior.

Culture history is the subdivision of general history that is concerned with the historical development of nonliterate peoples, present and past. It is almost always practiced by cultural anthropologists, if we include under this designation such specialists as archeologists and anthropological linguists. This definition implies that there is no real difference in principle between the history of the professional historian and the culture historian. Sometimes an attempt is made to distinguish between the two by contrasting the use of written documentary sources as the chief or only kind of evidence admitted by the historian proper with the variety of other, more conjectural methods used by the student of nonliterate cultures. This point of view has occasionally been taken either by historians who wished to resist extension of the field of history through these methods or by "schools" of anthropologists, such as the earlier social functionalists, who admitted the value of "genuine" history based on documentary evidence, while rejecting the "conjectural" culture history of historically minded anthropologists.

It is clear, however, that such a distinction cannot be maintained on principle. As noted in standard handbooks of historiography, the task of historical investigation involves the use of all types of evidence regarding the past. Thus E. Bernheim ([1905] 1926, p. 62) states that all peoples can be subject to historical investigation and that the principles of historical investigation are everywhere the same but that differences in the nature of the evidence require specialized knowledge and training. Thus, ". . . it is in the interest of a scientific division of labor to assign the history of primitive and prehistoric peoples to the ethnologist and archeologist." Besides, even where documentary evidence exists in abundance, as it does from the ancient classical world, nondocumentary techniques, such

as archeology and comparative linguistics, have made essential contributions and are used by professional historians. On the other hand, anthropologists have come to realize that they are by no means limited to nondocumentary methods. For many parts of the world there are frequently historical documents that may shed valuable light on cultural changes undergone during the centuries between first contact with the West and professional anthropological field study. In some instances, there may even be indigenous historical records neglected by the historians because the area is outside of the normal purview of their interests. This was the case, for example, with the Islamized peoples of the Sudan.

The aim, then, of culture history, is in no essential respect different from that of conventional history, particularly when the latter is viewed in its most general aspect as not merely political history but as history of all aspects of culture. It may be added that for his primary goal, the understanding of cultural development, the culture historian will need certain noncultural data, such as environmental changes, human racial differentiation as the result of isolating mechanisms paralleling ethnic differentiation, and inferences concerning ancient demographic factors. The difference between culture history and conventional history is then one of degree rather than kind. Since he necessarily relies to a greater extent on nondocumentary sources, the culture historian will be concerned with groups and not individual actors, and the time scale will often be relative rather than absolute. However, with the development of radioactive and other methods of absolute dating, even this latter difference tends to be effaced.

General methodology

All historical investigations proceed by inferences, often very complex, from evidence existing in the present. The relation between the evidence itself and the fact of which it is a trace is of two main logical types: cause and effect, as when an artifact is taken as evidence for the human activity that produces it; or symbol and referent, as in verbal accounts (whether written or oral) in which the evidence is a description of the fact. Traces differ, as

will be seen later, in still other respects. Particularly in culture history, where documentary evidence is usually minimal or lacking, the general strategy of the historical enterprise is based on the circumstance that the same event may leave multiple traces, each of which provides independent evidence for the fact.

For example, if at some time in the past one people has borrowed the cultivation of a food plant from another, it will have taken over the genetic varieties utilized by the donors and the same or similar methods of cultivation. They may have borrowed the word for the plant itself or other terminology connected with its cultivation. These aspects are independent, in that some might have been present in the original event without the others and since their present outcomes are distinct, e.g., the genetic plant varieties now utilized, the observable agricultural methods, and one or more words in the present language. Each of these evidences may be said to belong to a different system, because for its interpretation we must put it into a context of different facts. Thus the data concerning a particular genetic variety of plant are significant in the light of the totality of varieties, their geographical distribution, and the reconstructed genetic history of the species itself in relation to the wild ancestral form. The agricultural methods are part of an ethnologic distribution. The linguistic terminology is part of a language and must be evaluated in terms of appearance or non-appearance in related languages deriving from a linguistic classification itself based on linguistic evidence.

Each of these traces, then, is interpreted in terms of the system to which it belongs. Although the details of method differ for each system, they all have in common the important characteristics of being comparative and involving assumptions regarding diachronic processes.

It has sometimes been felt that certain types of historical inferences involve a comparative method, for example, those based on language or ethnological trait distributions, while archeological artifacts or documents give direct testimony concerning the facts for which they are evidence. There is at best, again, merely a difference of degree of complexity and not of kind. An archeological implement must be compared with other implements with regard

to form, function, place, and time before it can be assigned any historical meaning. This is true for written documents, as we are reminded emphatically by the historians Langlois and Seignobos, who state that a document "in respect of which we necessarily are in total ignorance of the author, the place, and the date is good for nothing" ([1898] 1925, p. 87).

Another fundamental set of considerations involved in the construction of such interpretive systems refers to process. By a process is meant a class of similar changes. To draw an example from textual analysis, if the same word appears twice within a few lines of a manuscript that is being copied, a scribe, in looking back through the manuscript, will sometimes mistake the second occurrence for the first and so eliminate the intervening material. Such an error is called haplogy and may be called a process. Since manuscripts of all periods, places, and languages are subject to haplogological change, like other such processes it may be considered as a class in abstraction from its specific temporal and spatial loci. If two manuscripts share the same haplogologies along with other specific changes, one may conclude that they have both been copied from the same version and thus do not furnish independent evidence regarding the original text. By such reasoning, manuscripts may be arranged in a genealogy and their comparative study can lead to the reconstruction of the lost original. In reasoning by means of process, such factors as the frequency with which instances are likely to occur, whether two identical instances will tend to occur independently, and the length of time required for their occurrence are all among the fundamental considerations. For example, another process in manuscript transmission is the interpolation of marginal explanatory glosses into the body of the text. Obviously, it is more likely that a particular haplogological error will occur twice independently than that an interpolation involving precisely the same words will occur at all.

Human activities are not the only processes relevant to cultural-historical reconstruction. For example, the patination due to the weathering of artifacts is a process of change and allows us to draw very approximate conclusions regarding age. The point here is that the historical conclusions to which we are led by

particular existing evidence is dependent on our assumptions about the processes of change it has undergone since the time it came into existence.

Specific methods

A number of the independent methods mentioned earlier may now be considered in greater detail.

Verbal evidence. All verbal evidence has as its source linguistically formulated descriptions by observers of the original event or events. Whether this primary source is oral or written in its first form makes little or no difference; it is subject to the same possibilities of error through observer bias, inaccuracy, or prevarication. The differences between written and oral sources stem from the mode of subsequent transmission. The advantage of writing is that, because of its semipermanence, it will go through fewer reproductions and will be less changed in the course of such reproductions. Since it will thus be closer to the original report, it will be easier to reconstruct the exact verbal form of the report. The form in which the historian encounters the report is not in itself decisive. Thus, literary sources often contain accounts written down at some time from oral tradition, so that the report has been transmitted orally during the earlier part of its career and in writing later on. The opposite also occurs when literary formulations become the subject of folkloristic transmission.

The critical use of written documents, the chief source of the historian's history, falls under the methodology of history proper and is thus only briefly discussed in the present connection. It is relevant, however, to point out that the culture historian's written documentation is most frequently that of the outside observer, such as the explorer or missionary, rather than the participant. It is therefore subject to errors based rather on the outsider's inability to comprehend the cultural frame of reference of the actors than on bias. Therefore, the inaccuracies are characteristically of a different kind from those of the internally placed participant. Thus, contrary to the latter, the outside observer will not tend to conceal

military defeats or the historical illegitimacy of the power exercised by a ruling dynasty.

Anthropologists take as their point of departure the notion of primitive peoples as peoples without written history; but beginning about 1950 it became apparent that the extent and the value of both external and, in certain cases (e.g., West Africa), internal documentary sources had been seriously underestimated. The Indian land claims cases in the United States also led to much documentary research into land occupation and use patterns of the aboriginal period. Such interests led to the development of ethnohistory as a subdiscipline of anthropology.

The other chief source of verbal reports is oral tradition, which includes not only orally transmitted narrative history but other kinds of spoken material containing historical information, e.g., proverbs and epic poetry. This source is perhaps the most controversial. Thus, G. P. Murdock (1959) discounts it as altogether unreliable, while J. Vansina (1961) makes it the very keystone for his reconstruction of the history of a number of African peoples. As Vansina has pointed out, oral tradition must be used critically, and, indeed, it requires a methodology very similar in principle to that required for the study of documentary sources. More perhaps than any other source, it has been employed uncritically in the past. Oral traditions have been published without indication of the individual, place, or date from which they derive, of facts, if any, regarding the manner of their earlier transmission, and without variant versions. As for manuscripts, it is possible to develop a genealogy of lines of independent transmission and reconstruct the archetype or original version, a method similar in basic respects to that developed by the Finnish school of folklorists for oral literature in general. The time depth and chronological precision of oral traditions are necessarily limited, but within these limitations they can give important and reliable information when treated critically.

Archeology. Among the remaining research methods, which have in common the reasoning from trace as effect to historical cause, archeology is to be distinguished from the rest in

that it deals with material objects as evidences of cultural activities of the period in which they were produced rather than with existing cultural phenomena viewed as developments from, and hence evidences for, earlier cultural traits. Thus, subsequent modifications of form, if any, are normally the result of natural forces independent of man. The strength of archeology is the reliability and concreteness of its evidence and the definiteness of its spatial attribution. Its necessary limitations stem from the fact that it is confined to material culture and deductions that can be made therefrom. The set of artifacts found at a particular site and stratigraphic level, sometimes called a component, is taken as the material expression of the life of a local community. Often very similar assemblages are found over a continuous area with indications that they all date from roughly the same chronological period. Such a unit, often called a phase, may be conjectured to represent some sociocultural unit, such as a tribe. The interpretation of archeological evidences regarding a phase has both cultural and social aspects. From settlement patterns, density of remains, the functions of the artifacts themselves, and evidences regarding contemporary climate, fauna, and flora, the attempt is made to reconstruct the basic technologic and demographic patterns with whatever further, usually less certain, inference can be made regarding other aspects of culture, such as social structure or religion. There has also been an attempt to identify and determine the geographic boundaries of ethnic groups. Contemporary evidence shows that such conclusions are subject to a considerable margin of error, since, on occasion, ethnic groups with highly similar material cultures may differ fundamentally in language and other cultural aspects and constitute politically independent groupings.

The second fundamental aim of archeology is to reconstruct the time-space relationships of the sociocultural entities inferred from material remains. The basic problem is, of course, chronological rather than spatial. Relative dating methods include the stratificational (when in the same site more recent material is superimposed on more ancient), estimates of length of occupation from the nature of the deposits, inferences regarding the rough contemporaneity of sites with similar material, cross-dating from traded objects whose date and provenience is known from documen-

ary sources, and geochronology. Where other methods fail, the evolutionary assumption that simpler types precede more developed has been utilized. Such conclusions are most plausible where we are dealing with mechanical inventions that presuppose other less complex devices that enter into them or where a more efficient device requires the development of some specific and recondite skill, e.g., smelting metal as compared with the utilization of stone. In recent years the development of methods of radioactive dating, such as carbon-14, has revolutionized archeology by providing absolute dates.

Beyond the placing of archeological units in space or time, there are inferences regarding the historical relationship of particular cultural traits, complexes, or cultures as a whole. With the prerequisite of space-time continuity established or reasonably to be conjectured, cultural similarities are interpreted as resulting from such historical processes as geographic migration of a people or by diffusion, in which the traits are borrowed through contact with a neighboring people. Such integral spread or adoption of cultural features is often called genetic. Sometimes however the connection is not genetic, although historical. For example, trade objects may be distributed along recognizable trade routes, which indicate cultural connections, although the objects themselves are not actually produced in all of the sites in which they are found. There are of course cultural resemblances that are nonhistorical in origin and are the result of independent parallel developments. What is to be assumed a similarity will, of course, depend on the definitional criteria adopted. Under more general criteria things will be considered similar that are rejected under narrower criteria. The disputed cases are characteristically those that combine generality of criteria with absence of well-proved space-time continuity, e.g., Egyptian and Mayan pyramids.

A further major contribution of archeology has been to furnish materials from the distant past that complement the documentary history of more recent periods and permit speculation about the long-term "evolutionary" trends of cultural development. Thus, archeology provides support for theories regarding the evolution of technology and systems of economic subsistence.

Trait distribution. Another basic method for reconstructing history that employs cultural materials is the study of the geographical distribution of cultural traits, which reads historical depth into spatially arranged data. In the broadest sense, comparative linguistics is but one example of this approach, but since it is the least controversial, has the most explicitly developed method, and contributes most largely and reliably of all cultural distributional methods, it will be discussed first.

Comparative linguistics. We may consider that every language is a cultural subsystem, that such subsystems are distributed over geographical space, and that each meaningful item in a language is a cultural trait that involves form ("sound") and function ("meaning"). The first step in comparative linguistics is the classification of language into mutually exclusive families, each consisting of related languages. A family of languages is a set of distinct languages presumed to have arisen from a single earlier language (the so-called protolanguage) through a course of differential changes. In the initial period of such changes, when the differences are still small and mutual intelligibility still obtains, localized variants are called dialects. Dialects, as they diverge more and more in the course of time, cease to be mutually intelligible and rank as separate languages. The languages resulting from such an earlier process are said to have a common origin and form a family of related languages. This process may occur a number of times successively and still give recoverable results. Thus, Proto-Indo-European developed dialects that became the ancestral languages of the various branches of Indo-European, e.g., Celtic, Germanic, Slavic, Indo-Aryan, Italic. Italic, like the others, in turn split into separate languages, e.g., Latin, Oscan, Umbrian, Venetic. Of those, only Latin survived, and it in turn has developed into the modern Romance languages.

The comparative method reconstructs this course of events by classifications, such as the one just briefly sketched. Through the observation and evaluation of resemblances involving sound and meaning and, further, through the regularities inherent in processes of linguistic change, most conspicuously phonetic change, the further

step is taken of reconstructing as far as possible, and often in considerable detail, the phonetic system, grammar, and vocabulary of the ancestral language. Only exceptionally, as in the case of Latin as ancestral to the Romance languages, is there independent written evidence regarding this language.

Thus every family of languages at whatever level of classification implies an ancestral language that is capable of at least partial reconstruction. Such an ancestral language implies a community of people as its users, a degree of cultural homogeneity, such as is normally found among speakers of the same language at the present time and for past documented history, and a placement within geographical and chronological limits. It is clear that the determination of spatial-temporal location of a sociocultural unit speaking a language whose features have been largely reconstructed and historically related to later or contemporary speech communities is in itself an important cultural-historical datum.

Non-linguistic inference. The reconstructed linguistic facts are themselves cultural-historical facts, but what is of wider interest to the culture historian are the nonlinguistic cultural inferences that flow from such linguistic facts, as, for example, words that show the probable acquaintance of the speakers with certain technological items or religious concepts. Such items of protovocabulary are reconstructed word-forms, continued in a sufficient number of later instances to allow us to infer their approximate phonetic shape and meaning and to assign them to the ancestral language. It is a further advantage of the comparative linguistic method that it almost always allows us to distinguish between resemblances among languages that result from continuation of an actual item in modified form (cognates) and resemblances among languages, whether related or not, that result from the borrowing of words from one language by another where the speakers have been in contact. It is also often possible through purely linguistic methods to arrive at conclusions regarding the direction of borrowing.

Accordingly, there are three chief types of inference regarding nonlinguistic cultural phenomena that can be derived from the

comparative study of language: those drawn from facts concerning the classification and distribution of languages, those based on protovocabulary, and those based on interlinguistic contacts. From the detailed classification and subclassification of the members of a linguistic family, combined with their present geographical distribution or, where available, from the evidence of documentary history, their past distribution, it is possible to draw probabilistic conclusions regarding the area occupied by the ancestral speech community. From this will also follow certain hypotheses regarding subsequent migrational spread resulting in the distributions found in later historical periods. The fundamental assumption made is that every genetic branch of a linguistic stock, regardless of its present population size or geographical extent, provides, by its location, equal and independent evidence regarding the original center of linguistic distribution. The procedure implicit in this assumption may be called the "center of gravity" method. The best possible guess is the average of positions of each genetic branch. The center of each of these branches that enters into such a calculation may itself require calculation in terms of its subbranches, if any. Thus, if we had no written records to show whether English had originated in the British Isles, North America, South Africa, or Australia, the classification of English as a Germanic language within Indo-European, the fact that its closest relative within Germanic is Frisian, spoken by a small fishing population on the Dutch and German coasts, and the distribution of other subbranches of Germanic in Germany and Scandinavia would point to England as the immediate point of dispersal and to the continent of Europe as the location of ultimate origin. In fact, considering the level of classification represented by dialect variation, since the deepest and most fundamental dialect divisions exist in the British Isles, one can assume that this is the center of dispersal and that the rest of English distribution results from the relatively recent spread of certain older dialects from this center. An important independent check involves an application of the protoword method. Part of the reconstructed vocabulary of the protolanguage may reflect the geographical environment of the original area of settlement but must be interpreted in the light of paleoclimatic and paleontological knowledge. This method requires considerable caution in its application because of the possibility of parallel semantic changes

and because it is often necessary to argue from the negative standpoint of the absence of a given terminology. Both points can be illustrated for a hypothetical example of a language family in which it is impossible to reconstruct an original word for "ocean," thus leading to the conclusion that the protocommunity lived inland. It may either be the case that there was such a word but it has independently been replaced by different terms in each linguistic branch or that it survived but transferred its meaning to "lake" several times independently through movements inland, so that the meaning of the term has been incorrectly reconstructed. The possibility of the reconstruction of a whole set of semantically related terms obviously strengthens such a case greatly.

For reconstructing the time as against the place of the ancestral speech community, the only method of absolute chronology that has been proposed is that of glottochronology (see Hymes 1960). The method is based on the assumption that every language has a basic vocabulary that is composed of certain elements, such as pronouns, low numerals, and parts of the body, and that this basic vocabulary has a relatively low and constant rate of replacement by new forms, whether by internal changes or by borrowing. The rate of replacement is estimated from test cases involving historical documentation with a known chronology, e.g., Latin to French. If we assume random and independent loss for related languages at the same rate as for the test cases, then from the proportion of cognates in the list for any pair of languages the rate at which the ancestral language began to diverge can be estimated. The estimate in current use is that in one millennium per cent of the 100-word list is lost. This method has been widely applied but has also suffered severe criticism, both regarding the empirical results obtained in the test cases and the mathematical assumptions. It is, however, quite possible that when subjected to necessary revisions, it will give useful results.

The protoword method also permits inference from reconstructed vocabulary regarding the culture of the ancestral speech community. Thus the essentially village, neolithic nature of the proto-Indo-European culture is shown by the existence of reconstructed terms for a number of domesticated plants and animals,

the words for "plow," "village," etc. Other reconstructible parts of the ancestral vocabulary of Indo-European include the kinship terminology and the names of certain divinities.

Culture contact. The remaining major source of cultural-historical information based on linguistic data is the study of linguistic-contact phenomena. The most important data are furnished by loan words because they frequently have specific cultural content and because the direction of borrowing can be determined in favorable cases. One type of linguistic-contact study is that which concentrates on the contact of one language with another over an extended period. Such an investigation may be considered the linguistic analogue of acculturation studies. It is often possible to distinguish different periods of contact based on the "stratigraphy" of the changes undergone in the borrowing language. An over-all study of this kind will also show the specific aspects of culture in which borrowings are most numerous and fundamental and thus provide important evidence concerning the nature of the culture contact.

Instead of considering the language communities and the nature of their linguistic contacts as the primary interest, we may focus our attention on a specific cultural item. For example, we may examine the linguistic evidence in its bearing on the details of the spread of tobacco. Since a cultural item may be borrowed without the word being borrowed and because the direction of borrowing cannot in every case be discovered, linguistic evidence will not usually provide a complete history of diffusion, but it will furnish many important detailed hypotheses.

The detection of borrowed words may sometimes show that speech communities not now in contact must have been so in the past. Sometimes the contact must have been with an earlier protocommunity. Thus, Finnish has a number of words borrowed from very early Germanic that approximate reconstructed Proto-Germanic forms.

In addition to borrowings, where languages have been in intimate contact with a large bilingual population over a considerable

period, there will be a tendency to convergence in the sound system and grammatical structure. Thus, a number of Balkan languages of diverse branches of Indo-European share such features as a postposed definite article (Rumanian, Albanian, Bulgarian), a future formed from an auxiliary "to wish" (Rumanian, Albanian, Serbo-Croatian, Bulgarian, Greek), and other details. These are not borrowings, since, for example, the verb "to wish" is in each case the indigenous word. Thus, areas of mutual linguistic influences can be determined that parallel the notion of culture area in cultural anthropology.

The independent nonlinguistic methods involve the mapping of the distribution of cultural traits. The main conclusions drawn are that highly detailed traits, e.g., specified art motifs, if found in a restricted geographical area, have a common historic origin. The place of origin and process of spread are difficult to recover on purely distributional evidence. One widely accepted principle of inference is that a trait is older in an area in which it is more elaborated and more integrated in the cultures in which it is found or exists in a greater variety of forms, since such developments require time. Another is known as the age-area hypothesis: other things being equal, a more widely distributed trait is older, since such spread requires time.

Reconstructing social systems. One class of methods using nonlinguistic cultural data involves an extension of the comparative linguistic method. The attempt can be made to reconstruct aspects of the culture of the ancestral speech community by a comparison of nonlinguistic traits of the speakers of the languages. This method has met with limited success in the case of comparative Indo-European mythology. Just as the names of divinities may be reconstructed by linguistic comparisons, so the plots of myths involving the divinities may be compared in order to reconstitute their original forms. Such attempts encounter the difficulty that for nonlinguistic aspects of culture, there is no systematic way to differentiate between resemblances resulting from diffusion and those stemming from common origin. The method developed by Murdock (1949) belongs here. Since only certain changes of type are regarded as possible and since social structure

is presumed to be, like language, relatively impervious to external diffusional influences, the comparison of social structures of linguistically related peoples leads to the reconstruction of the type of social structure of the ancestral population and its subsequent changes. Unlike language, where there are thousands of independent vocabulary elements, there are relatively few types of social structure; therefore, the same type of social structure is not probative of historical connection between two peoples. Linguistic comparison is thus a method for reconstructing the social structure of peoples known to be related on other grounds and not primarily a method of discovering historical relationships not otherwise known.

Biological history. The study of certain noncultural phenomena may be coordinated with that of culture history. Thus the genetic history of human populations is clearly relevant to culture history. The isolating mechanisms that produce partly or fully discrete breeding populations are in general congruent with those producing cultural and linguistic isolation. For example, the linguistic distinction of Eskimo-Aleut from the remaining language groups of the indigenous Americas parallels a physical distinction and is the common result of the same isolating factors. There is thus the possibility of mutual corroboration for historical inferences in both areas. For example, the genetic distinctness of the African and Oceanic Negro, which now seems assured on genetic grounds, is in agreement with the linguistic evidence, which is also negative on the same point.

Domestication. A further important noncultural source of cultural-historical conclusions is the study of domesticated plants and animals. Given a genetic classification of species and varieties or races and their relationship to wild forms, the basic principle is one parallel to the center-of-gravity method discussed above in relation to linguistic classification. Thus, the center of origin should be in the same area as the wild forms, and the earlier and more basic genetic differentiations of the domesticated forms should have taken place at earlier centers of cultivation. Here again, the history of plant and animal domestication is in itself important as culture history and provides further independent evidence regarding contacts of people.

The potentialities of the methods outlined here have been only very partially realized. The reasons for this are both theoretical and technical. Since they were applied on a grand scale but based on a limited range of evidence and an unsophisticated methodology by the cultural-historical schools of the early twentieth century, in the reaction that followed, interest was focused on structural-functional problems to the relative neglect of culture history. Moreover, practical difficulties are raised by the wide variety of methods required that cannot easily, if at all, be controlled by a single specialist. The most noteworthy attempt thus far is that of Murdock's study of Africa (1959), which utilizes evidence from archeology, linguistic classification, social structure, and plant genetics. But even this study does not take into account many further lines of evidence, such as loan words and the distribution of art styles.

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Language contact studies deal with the influence of languages on each other. The topic is obviously a very broad one. Moreover, in principle there are no exclusively African problems, only general linguistic problems in an African setting. Still, the variables which are present in language contact situations are not present in the same degree or the same manner in different major world areas. Thus, the relation between a prestige-laden standard language and various local patois which dominates much European discussion of language contact problems rarely exists in Africa.¹ On the other hand, the existence of an official language which is not the first language of any segment of the indigenous population is common in Africa but is not found in Western Europe or the United States. Since most studies of interlingual contact have been carried out in these latter areas, African data may contribute new and important material for the testing of old hypotheses and the formation of new ones.

In view of these factors, the present paper is chiefly programmatic, the primary purpose being to provide a preview of the range of such problems. This review makes no claims to exhaustiveness. The emphasis is on suggestions for possible avenues of research which have not yet been undertaken on a wide scale in Africa, or in some instances, anywhere. Of necessity, some of the topics do not fall within the exclusive area of competence of the linguist. That they are significant problems, susceptible of systematic study, is sufficient for them to be considered here.

The problems of languages in contact cannot be understood without reference to individual and social psychological factors and the social and cultural and political environment in which it takes

place. This will be evident at various points in the subsequent discussion. Hence some topics will be most effectively approached through interdisciplinary team research and still others, though of interest to the linguist, may be best studied by representatives of other disciplines. Nothing stated here should be construed as deprecating the importance of the normal linguistic activities involved in descriptive and historical studies. These are of central and fundamental relevance to almost all the problems envisaged. Moreover, only the linguist is equipped to carry out this task and to do it he must continue to devote the major share of his interest and effort.

The focus of language contact is the bilingual individual.² It is not languages which are in contact but speakers. The individual who speaks two languages is almost certain to have his performance in one language affected by interference from habits employed in speaking the other. Although this is of primary concern, it should be pointed out that the existence of literary traditions permits significant linguistic influence without contact between the members of different speech communities and without bilingual speakers. Thus English borrows from Latin and Greek. Indeed, a language may be even in contact with its own past, as in the instance of Arabic colloquials in relation to the literary language. There are also possible examples of the borrowing of names for trade objects without genuine bilingualism.

In sub-Saharan Africa there are two pre-colonial literary traditions which have exerted an important influence on contemporary spoken languages, the Arabic in some Moslem communities and the classical Ethiopic among Christian and Falasha Jewish populations in Ethiopia. An important factor in the study of these influences is the traditional pronunciation of these languages since these affect the phonetic forms taken by borrowings. Ethiopic has been studied from this point of view, at least as far as Amharic speakers are concerned but there seems to be almost nothing in print on the pronunciation of Arabic in Koranic recitation for such groups as the Fulani, Songhai, Hausa, Kanuri and Swahili.³ Such studies should yield important data for the history of the spread of Islam. In many cases Negro populations were proselytised by other Negroes, and thus the pronunciation of Arabic was learned indirectly. Evidence for such

intercultural contacts might be found through a comparative study of traditional modes of pronunciation.

As has been already noted, the normal medium of interlingual contact is the bilingual individual. However, language is a social phenomenon. Many of the bilingual's innovations in one language or the other are idiosyncratic and likely to be ephemeral. To have an effect on the language, the linguistic habit must be one which is likely to occur in the speech of other bilinguals and must then spread to the speech community as a whole. This suggests that for any appreciable effect to ensue in the long run, the number of bilinguals must be fairly large. Even so, if the language affected is spoken by a large population which is predominantly monolingual, it may well offer serious and successful resistance to many if not all innovations. Much obviously depends here on the relative power and prestige relations of the two speech communities, the possible conservative effect of a written standard, and attitudes towards language purity on the part of speakers. At a certain point the foreign convenience of certain well established innovations is no longer relevant and becomes a matter of historical inference. Thus to Hausa speakers many Arabic loan words of long standing are as completely Hausa as historically indigenous forms, while others are felt as neologisms not yet firmly established and perhaps not destined to be.

At either end of this continuum we have separate types of studies, each with certain advantages and disadvantages. By the methods of historical linguistics we can study the history of past contacts. There is a certain definiteness about such studies since we are studying the end results of an accomplished process. It has the disadvantage that many of the relevant factors regarding the sociocultural matrix in which the contact was accomplished are no longer reconstructible from historical records. On the other hand, we can study the process of on-going language contact in the individual by contemporary observation and we can also hopefully study the conditions of contact among the communities, but without a sufficient diachronic perspective it is difficult to assess which phenomena will affect the linguistic structures in the long run and which will not.

At any particular point in time different linguistic forms of

foreign provenience have varying statuses with regard to degree of integration in the established system. No adequate techniques for such processual studies have yet been devised and the difficulties are indeed considerable. It is suggested here that there are at least three main indices of assimilation for such forms — linguistic, sociological and psychological. Linguistic indices include adaptation to the indigenous sound system, definite assignment of membership to a grammatical class, e.g. nominal classes, and full participation in an inflectional system. Currency in various socio-economic strata and occupational groups is a basic sociological factor. It is perhaps not impossible by questionnaire and sampling techniques in conjunction with studies of social stratification and regional variation to develop methods for studying the degree of acceptance and just as importantly, the pattern of assimilation of new forms in relation to local and class differences. For the factor of local variation we have the well-tried techniques of linguistic geography which have yet to be applied on a significant scale in Africa.⁴ The psychological dimension would involve judgments of speakers regarding the degree of "nativeness" of forms of foreign origin. Here some scaling technique might be developed with the co-operation of social psychologists. It is the two extremes here which are most amenable to study and which are conventionally labelled as diachronic and synchronic. Each merits separate consideration.

Among diachronic studies of linguistic contact, it is again possible to distinguish several types. One principle of classification parallels that between diffusion and acculturation in culture-contact studies. The other is more specifically linguistic in nature, involving a difference between what I shall call here borrowing and influence. In diffusion studies our interest focuses on the history of some particular cultural trait. For example, the recent work of Murdock has stimulated interest in the problem of the origin and spread of domesticated plants in Africa.⁵ The linguist has one important contribution to make to these and similar problems. The linguistic study of word borrowings in the terminology associated with various traits of culture-historical importance is capable of providing significant independent evidence on many points. The study of borrowings naturally figures in a wider context of reconstructional historical linguistics. Inferences regarding culture history will also

include those directly stemming from classifications, from the use of glottochronology and from reconstructed vocabularies of ancestral languages like those already available for Bantu. The study of borrowings has one potential advantage over other methods involving the distribution of cultural elements. It is often possible to determine the direction of borrowing, and with it, the probable direction of cultural influence.

However, the study of word borrowings for some particular subject of culture-historical interest requires for every particular case a consideration of the entire range of contact of the two languages. A single case cannot usually be considered in isolation from other evidences of interlingual contact. This other type of study may be called acculturational. In such studies, the nature of the contact of the two speech communities as evidenced by the total range of mutual influence is considered. A comparison of phonological structures of the two languages, evidences of direction of borrowing based on analysability in one language or the other and the semantic areas involved must all be taken into account.⁶

The programme envisaged is thus a vast one. Each particular historical contact situation will require separate study. In principle, however, this is a realisable though arduous goal. The subject is of inherent linguistic interest. In addition, the awakening interest of historians in the possibility of contributions from linguistics in this area imposes on the linguist an obligation to develop this aspect of historical linguistics in Africa to a greater extent than heretofore.

The study of borrowings, which involves sound and meaning simultaneously is to be distinguished from the study of influences which concerns either sound only or meaning only. That, as the result of long continued contact, the sound systems of contiguous languages, whether related or not, tend to become more similar is well established. This may result in a considerable uniformity in total sound systems within specific geographical areas of extensive interlingual contact. For example in the Plateau province and adjacent areas in Nigeria, both Niger-Congo and Chad languages have as a favorite type a six-vowel system, a, ə, e, i, o, u. The mapping of the geographical distribution of specific sound features

is of interest here. Thus the labiovelar articulations kp etc. have a coherent and practically continuous distribution across most of Africa from the Atlantic into the Eastern Sudan, in a belt which is relatively narrow in the north-south direction.

It should be emphasized that such mappings are simply useful in setting the stage for a series of specific linguistic investigations. To compare them directly with the distribution of non-linguistic traits is premature. Among related languages the existence of common sounds may be the result of retention of sounds from the ancestral language rather than of recent spread. Here again the basic framework provided by orthodox comparative linguistics is necessary. The frequency of the sounds in question in the particular language and their occurrence in loan words as against inherited words must be examined before conclusions are reached. To revert once more to the example of labiovelars, although they are almost continuously distributed, they are in fact found in very few languages of the Chad branch of Afroasiatic. Moreover where found in these languages (e.g. Bata, Bolewa) they are statistically rare and occur predominantly in loan words from Niger-Congo languages. Hence their contiguous appearance in Chad and Niger-Congo languages on a map, taken at its face value and without comparative and historical evaluation, might all too easily lead to invalid conclusions.

Grammatical and semantic categories also lend themselves to areal mappings and similarly invite historical interpretations. Some similarities of this type have, as has often been noted, a wide-spread, often almost continent-wide distribution. One example is the use of a verb 'to surpass' to express comparison. It should be noted, however, that this is not universal in Africa and that a number of sub-types can be distinguished with different geographical distributions. Thus, some languages have comparisons of the form 'X surpasses Y in size' but others have 'X is large, surpasses Y' to mention what are probably the two most common variations.

For some aspects of grammatical and semantic structure detailed monographic studies of particular phenomena of the kind which are already a commonplace for European languages need to be undertaken. Thus, for tense-aspect forms of the verb, certain

categories appear to be very widespread, e.g. habitual, progressive, future and punctual. It would be of great interest to develop a typology of tense and aspect systems for African languages. However, this is an area in which the facile use of conventional labels can easily lead us astray. The recent study by Arnott of the subjunctive in Fulani is an example of the type of specialised study which must form the basis for wider generalisations in this area.⁷ Further well-nigh inexhaustible sources of comparative typological studies are verbal-derived forms and the nominal classification systems of African languages.

Enough perhaps has been said to give some notion of the scope and importance of what remains to be done in the historical study of language contact. Turning to more recent contemporary problems of contact, the most marked difference between this and earlier periods is the effect, direct and indirect, of European colonisation on the linguistic situation of Africa. Even where, as in so much of Africa, colonial rule is a thing of the past, the use of European languages, particularly English and French, as auxiliary spoken languages, as media of educational instruction and in diplomacy, lends a continued importance to the entire question of European-African linguistic contacts.

One may distinguish here the direct from the indirect effects of colonialism on the linguistic situation in Africa. Of these, the latter are doubtless of far greater significance. By the direct effect is meant here the influence of European languages on the vocabulary and the doubtless far lesser effects on the grammar and phonology of African languages. The chief indirect effects, to be discussed in more detail later, include the guided and unguided spread of auxiliary languages, whether European or African, the production of standard orthographies with coincidental standardisation of phonetics and grammar of African languages, and the development in some instances of a considerably expanded technical vocabulary. Even where, as in the case of Hausa or Swahili, some other language such as Arabic is utilised for this purpose, the stimulus has been the introduction of Western technologies and with them the necessity for the development of an appropriate terminology.

The direct influence of European languages, particularly English and French, on African languages has been little studied. This influence is of course most obvious in lexicon. The tendency here is often to exclude from dictionaries on puristic grounds words of European origin. Admittedly it is not easy in some cases to draw the line between forms which may be considered to be fully functioning items and those which have not and may never attain this status. An analysis of the speech of literate Africans who have a good command of both European and African language would be of interest here, in comparison with the speech of non-literate monolinguals. We should expect in fluent bilinguals some awareness in speaking the African language of quotation and "code-switching" as against European loan words as a legitimate part of the language. The reaction to the demands for new terminology of those African languages which have been used for educational and scientific literature is another aspect of the problem. There are three chief ways in which such demands can be met: (1) semantic extension of indigenous terms, (2) new formations, e.g. derivations, phrasal compounds, often calques, based on indigenous roots, and (3) borrowing. The first of these probably always takes place to some extent while it is never adequate for the entire task. The important choice is between the second and third methods. It has been noted that American Indian languages north of Mexico tend to adapt to modern conditions with few borrowings while those of Latin America borrow more heavily from Spanish or Portuguese. A study of African languages from this point of view would broaden the base on which any general theory accounting for such facts might be based.

African languages with noun classes afford an opportunity to test cross-culturally the operation of factors which have been noted in the assignment of gender to loans in immigrant languages in the United States.⁸ It would seem that phonetic factors play an occasional role here as when Arabic kitab is assigned to the ki-class in Swahili; however, the predominant factor is semantic. The assignment of class affiliation to new words would seem a valuable clue to the conscious and unconscious generalisation about the meaning of particular classes. Particularly striking in the African case

is the tendency for most borrowings to cluster in one or two classes. Thus many Bantu languages seem to treat loans by a dichotomous choice between the li-/ma- class for nonpersonals and mu-/ba- for personals. To what extent are the sheer frequency of a class and its present semantic make-up factors in such a development? It would be interesting to ask Bantu speakers with a command of European languages to assign classes to nouns in the European languages experimentally even where they are not in current use as loan words.

The direct influence of European languages is of course most obvious in vocabulary. However, the question of European semantic influences, in particular in certain grammatical categories, is at least worth raising. Here literary mediation, particularly in Bible translation, may well be a factor. In some instances Bible translators have, for example, picked on a fixed African equivalent for each English or French tense form. If this establishes a literary norm, the prestige incidental to literary forms produces at least the possibility of assimilation in some degree of European language usage. Another instance of this is compulsory pluralisation in English as against its nonexistence or noncompulsoriness in many African languages. Here again translation literature as well as widespread use of the European language by Africans will tend to the more frequent or even compulsory use of plurals.

Earlier, there was brief mention of the indirect effects of European upon African languages. Perhaps the single most important result here has been the spread of various auxiliary languages as linguae francae, whether European or African. Such auxiliary languages existed, of course, in the pre-contact period but not to the same degree. Since the question of linguae francae and pidgins is a separate topic for this meeting,* as indeed their importance warrants, little need be said about them here. From the point of view of language contact, however, the following points might be mentioned. It is generally and no doubt justifiably assumed, that

*Second Meeting of the Inter-African Committee on Linguistics, Brazzaville, 16-21 July 1962.

when a speaker is bilingual and one language is learned at an earlier age and with far greater thoroughness than a later second language, the interference of the primary language on performance in the secondary is far greater than in the other direction. Linguae francae are spoken mainly as secondary languages by large numbers of bilinguals, themselves likely to have diverse primary language backgrounds. Hence the effects are likely to be deep and thorough-going. There is here a large field of study of interference effects from primary languages on both European and African linguae francae with obvious practical implications for those interested in the teaching of these languages.

In the United States in particular there has been much work based on what have come to be called transfer grammars.⁹ By a comparative structural analysis of the two languages involved, points likely to engender difficulties for those whose native speech background is the one in learning the other are to a certain degree predictable. Such transfer grammars have apparently not been prepared between European and African languages. Some would feel that, ideally at least, second language teaching should be based on detailed structural comparisons of the two languages. Thus teaching English to a Twi speaker is a different task from that of teaching English to an Ibo speaker.

In this connection the investigation of such languages as English and French as actually spoken by Africans becomes important. Superficial observation suggests that it might well be the case that a greater uniformity in, say, the English of African speakers exists than would be theoretically expected. This, if true, would be due to a number of factors. Transfer grammars suggest points of difficulty which vary with the first language of the speaker. However, the similarities among African languages on the basis of common origin and the areal spread of phonetic, grammatical and semantic factors mentioned earlier in this paper are such that over very wide areas African speakers will find at least roughly similar points of difficulty. Further, transfer grammars predict difficulties. But difficulties are often partially or completely overcome. Even partial solutions, where they exist, may well be identical because of similarities in the overall African speech background. Thus most

Africans speak tonal, non-stress languages. They will probably all tend to identify stress with high pitch and not to reduce unstressed vowels to the same extent as native English speakers. Finally, many Africans first encounter European languages and continue to hear them mainly from African speakers and tend naturally enough to use such African renditions as a model. What seems to be arising, then, are reasonably uniform "dialects" of English and French, which are practically no one's first language, very much as there exists an "Indian English". This dialect or group of dialects exhibits, in all probability, less interference from first languages than would be predicted from the model of individual transfer grammars.

Contemporary contact of European and African languages has been considered at some length. The structural differences between the two, their differential roles in African life, make this a study of considerable importance. However, contact between African languages continues to play an important part on the contemporary scene likewise. A vast number of Africans are not merely bilingual but polylingual in their everyday life. Not only widespread African auxiliary languages, but often languages of much more restricted use, are spoken as second languages particularly in areas of marked linguistic diversity. The manner in which Africans acquire other African languages, usually without formal instruction or knowledge of a written form of the language, is of great interest for the study of the effect of one language on another.

Since first language is the chief basis for tribal identity in Africa, the question of the survival as distinct entities of the linguistic groups is of crucial importance for the development of national supratribal loyalties. All the indications are that even the well-nigh universal spread of various auxiliary languages does not threaten the extinction of any linguistic community of substantial size (perhaps 10,000 speakers or more). Most language communities of smaller size likewise seem to be in no immediate danger. This prediction, if valid, ensures that multilingualism will be the normal state of affairs for vast numbers of Africans in the foreseeable future and that therefore Africa offers a rich field for the study of interlingual contacts under the most varied circumstances. The development of

language attitude scales, the study of linguistic interference particularly during the childhood period in which several languages are often learned, the development and application of measures of relative language proficiency, are just a few of the areas of investigation in which close collaboration between linguist and psychologist is indicated. More detailed language data in censuses and sampling by individual sociologically oriented scholars may provide more accurate information than has been available up to now on the extent of polylingualism and its distribution in relation to variables of social structure. Such studies along with the more intensive application of purely linguistic techniques should contribute substantially towards our understanding of language contact in Africa.

This review has been extensive rather than intensive. The writer is well aware that any one of a dozen topics mentioned in passing might have served as the topic of a much more detailed study. However, the attempt has rather been to survey the field broadly in the hope that issues would be raised which might serve as a basis for more detailed discussions in the deliberations of this conference.

NOTES

1. However, situations parallel to the European do exist in Africa. In Hausa, the standard dialect of Kano now has a position comparable to the standard written languages in relation to local spoken dialects.

2. Cf. U. Weinreich. — *Languages in Contact* (New York, 1953), p. 1. — "The language-using individuals are thus the locus of the contact."

3. For the traditional pronunciation of Geez see E. Mittwoch. — *Die traditionelle Aussprache des Aethiopischen* (Berlin, 1916) and M. Cohen. — "La Prononciation traditionnelle du Guèze," Journal Asiatique, 1921, 217-268.

4. For an application of linguistic geography in Africa, see A. Basset. — *Atlas linguistique des parlers berbères, Algérie* (Alger, 1936) and other works of the same writer.

5. G. P. Murdock. —Africa: its peoples and their culture history (New York, 1959).

6. For a more detailed discussion of the methodology of borrowing, see J. H. Greenberg. —"Linguistic Evidence for the Influence of the Kanuri on the Hausa," Journal of African History, 1, 205-212 (1960).

7. P. W. Arnott. —"The Subjunctive in Fula." —African Language Studies II, 125-138 (London, 1961).

8. Examples of studies of gender in loan words from English are G. T. Flom. —"The Gender of English Loanwords in Norse Dialects in America," Journal of English and Germanic Philology 5, 1-31 (1903/ 05); A. Aron. — The Gender of English Loanwords in Colloquial American German (Baltimore, 1931); and C. E. Reed. —"The Gender of English Loanwords in Pennsylvania German," American Speech, 17, 25-29 (1940).

9. An example of the procedure of transfer grammars is to be found in H. Wolff. —"Partial Comparison of the Sound Systems of English and Puerto Rican Spanish," Language Learning, 3, 38-40 (1950).

Among the most conspicuous phenomena noted by observers of the present-day African scene are the large-scale seasonal migrations and the related growth of urban centers. For, although most of the workers return to the rural tribal areas and not all migrate to urban centers (many work on farms), it is nevertheless true that the urban centers of Africa are growing at a significantly faster rate than rural areas. This expansion of population is a result not only of natural increase, but to a considerable extent of recruitment of immigration from the countryside. In other words, permanent urbanization of a substantial and increasing part of the population is now a continent-wide phenomenon.

Urbanism and migration are, of course, not exclusively colonial and postcolonial events in Africa. In particular, the historical record discloses the existence of large-scale agglomerations, especially in the western Sudan, the present Western Region of Nigeria, the east coast Swahili-speaking ports, Ethiopia, and perhaps even in Bantu Monomotapa in present Southern Rhodesia. Moreover, in some instances at least, the ethnic heterogeneity bears witness to the role of migration in the formation of such cities as Timbuktu, which even in the precolonial period contained Arab, Tuareg, and Songhai elements, to mention the most important.¹

Still the present movement toward urbanization differs in both quantity and quality from that of the precolonial period. In sheer size and number the cities are usually of a different order of magnitude. Moreover the functions they serve, directly or indirectly, result from the impact of the West. Formerly largely commercial,

or even raising their own food, as did the pre-British Yoruba cities, they now perform industrial or service and administrative functions that are of relatively recent and exotic origin. The link with the past can be seen, however, for these cities, particularly in West Africa, are often older communities, not new foundations, and inevitably the preexisting conditions continue to exert their influence. It has been pointed out, as a further historic connection, that the routes and the destination of migrants display, in many instances, the persistence of pre-European patterns.²

Lingua Francas

It is obvious that such large-scale movements of people as are now taking place must inevitably have repercussions on the most basic aspects of the societies involved; among these is the communication system, or language. In the present paper I attempt to give some notion of the nature and scope of these changes. I believe it will also appear that communication is an area in which we are short of basic information, no doubt because the problems are by their very nature interdisciplinary. It is only recently that linguists have begun to talk seriously about an area of research which they call sociolinguistics, and its very existence is probably unknown to many workers in other social sciences.³ I have attempted to discover the pertinent data from a fairly full, though not exhaustive, study of the literature on urbanism and migration, and to supplement these with my own personal observations. The inadequacy of the data will be sufficiently obvious. It is to be hoped, then, that by pointing to questions that cannot be fully answered on present evidence, this study may make a modest contribution toward outlining the problems of sociolinguistics in an African setting and toward sharpening the awareness of practitioners of social sciences, other than linguistics, to a set of problems that I believe to be relevant to their own research interests.

The most obvious, one might say elemental, problem of communication which arises for the migrant is that of a common language with his employer and others with whom he comes into

contact, whether in an urban or a rural situation. The overriding sociolinguistic fact about Africa is simply its vast language diversity. The conventional number of 800 separate languages for the continent is certainly an underestimate. These languages are for the most part the primary spoken languages in relatively restricted areas. Hence migrations of more than local scope are bound to bring populations with divergent native languages into the same urban or rural areas. With the addition of European employers and administrators, as well as clerical personnel who, if not Europeans, are likely not to be indigenous to the area in which they carry on their work, the existence of linguistic heterogeneity tends to be the rule. Among the few exceptions are the Yoruba-speaking cities of the Western Region of Nigeria which, as we have seen, existed in pre-colonial times. The Yoruba-speaking area is sufficiently extensive for these cities to have retained in large measure their linguistic and cultural homogeneity. Yet even here the necessity of dealing with Europeans and, in certain cities, with a significant number of other Africans, mainly Ibo-speaking people, creates a communication problem of the usual type, though of less significant proportions.

The usual solution to this problem is the so-called *lingua franca*. Terms in this area are not very well standardized. In the present context nothing is being asserted about the linguistic nature of this *lingua franca*. It may be a standard form of some existing language, or a "pidginized" form, or even, conceivably, a new creation. All that is meant here by a *lingua franca* is a language used for purposes of communication between people; it is not the first language of both communicating parties, but on occasion may be the first language of one party or of neither party. A given area might thus have more than one *lingua franca*, as so defined, and this situation occasionally exists.

Most frequently, however, there is a single lingua franca which tends to be dominant over a substantial area. This solution is rational, in a sense. Particularly if the *lingua franca* is the first language of the numerically largest group, it is the solution that requires the least amount of second-language learning. There is a further psychological advantage, for a single *lingua franca* is likely

to be, in many instances, a language foreign to both speakers. Thus neither has to make the compromise of speaking the other's language. That this element is important in interpersonal and intergroup relations may be seen from the fact that in most instances Europeans, who were in the dominant position, did not learn the African language. It was the African who had to make the linguistic adjustment, a situation that sometimes produced resentment on the African side. In other instances, the use of an African language or, even more, of a pidgin is viewed as "talking down" to the African, and likewise causes resentment.

The single lingua franca tends to become the dominant solution not because anyone plans it that way, but because, once a language has a head start by being the language of a numerically important group, particularly the locally dominant one, others discover the advantage or even the necessity of learning it. Once it becomes at all widespread, it has an advantage over other possible lingua francas so that its expansion continues. There is thus a dynamic quality to the spread of a lingua franca. It tends to accelerate after the initial stage is passed. Once well established, it is likely to be the subject of certain policy decisions making it an official regional language, for example, or a language of school instruction. Such adoption gives the lingua franca a further impetus. The only thing that is likely to arrest its spread is a rival lingua franca. A lingua franca, however, may spread very slowly when it encounters a language with a large number of speakers in a compact area, particularly if there is relative isolation from developing urban-industrializing trends. An example is Kanuri, dominant in Bornu Province in the Northern Region of Nigeria. Itself not expansive—it is rarely spoken by non-Kanuri—it has offered solid resistance to Hausa, the dominant lingua franca of the Northern Region. The demographic and economic factors are obvious. The Kanuri are a substantial population occupying a fairly large area, relatively undeveloped in the modern sense and hence with relatively restricted contacts with non-Kanuri speakers. A historical-psychological factor, however, also plays a definite role: Hausa was the language of the Fulani-dominated Muslim empire of Sokoto, which fought for supremacy with the Kanuri empire of Bornu in the pre-European period. This traditional

attitude of hostility still finds expression in an unwillingness to recognize the dominant position of Hausa and to accommodate to it.

Along with urbanism, *lingua francas* existed in the pre-colonial period. In the well-attested instance of Timbuktu, for example, Songhai functioned as the *lingua franca* and was known as a second language by the resident Bella Tuareg and Arabs. Indeed, it was largely preexisting *lingua francas* that spread as the result of repression of internal conflict and of the expanding trade and industrialization of the colonial period. In the pre-European period, languages spread in response to political and commercial needs. The large Muslim empires were always ruled by an elite from a particular ethnic-linguistic group. Other groups learned the language of the dominant group, just as more recently they have learned European languages. The expansion of internal and external trade tended to favor traders of the dominant group. It thus became expedient to learn their language in order to carry on trade. The empire of Mali, for example, which flourished in the Middle Ages in the western Sudan, had a dominant core of Malinke speakers. It seems reasonable to attribute the wide spread of the very closely related Malinke-Bambara-Dyula complex to its dominant position in this empire. Malinke was widely employed by traders, and is today the dominant *lingua franca* over extensive areas of West Africa, particularly of Mali, which takes its name from the old empire. Again, Hausa spread over an extensive area as a *lingua franca* in the pre-European period largely through its linguistic dominance of the vast Fulani empires of Sokoto and Gwandu. Together with trading, the mechanism of large-scale slave raiding, followed by linguistic and cultural assimilation of the diverse pagan groups, was a dominant factor in the precolonial spread of Hausa.

While several African languages thus became established as *lingua francas* through political and commercial factors in the interior of West Africa, in the centuries preceding the explorations and the colonial expansion of the nineteenth century quite different *lingua francas* developed on the coast. Here the contact of Europeans and Africans led to the development of "pidginized" forms of European languages, mainly English, French, and Portuguese. The manner in which these languages were formed still presents important, and as yet unsolved, historical problems. It does seem safe to assume

that these pidgins were widely disseminated in Africa before being brought to the New World.

A pidgin that becomes the first language of a population is called a Creole. Such Creoles became the dominant local language in a number of Caribbean Islands—Haiti, Curaçao, and Trinidad—and on the South American mainland. Taki-Taki is the English-based Creole of Surinam. The repatriated slaves who formed the original population of Freetown at the end of the eighteenth century likewise adopted their own common tongue, pidgin English, which in Africa itself thus became the first language of a population. Events of the colonial and postcolonial periods have fostered two major developments in the communication situation as thus outlined. The suppression of intertribal warfare and the establishment of rail and road communications have led everywhere to the expansion of indigenous lingua francas. These have usually been languages that had performed these functions in earlier times, such as Hausa, Malinke, and Swahili. Some African languages, however, usually in modified, pidginized form, have arisen in the European contact situation. Examples are Sango, the lingua franca of the Central African Republic, a pidginized form of Ngbandi; and Lingala, a similarly modified form of Bangala, spoken in the Middle Congo. Such new lingua francas do not seem to have originated in West Africa. I believe that the reason is the preexistence of urban centers whose heterogeneous populations already had well-established lingua francas, in contrast with the situation in most of central and eastern Africa.

The spread of lingua francas has been so extensive under the impact of Westernization that there is now hardly an area in Africa which does not have a dominant lingua franca. All our existing maps are first-language maps. There is a great need for precise information on the areas of dominance of lingua francas. We need to know not only the geographical area embraced, but the extent to which the lingua franca is known, the degree of its command, and its distribution in relation to social stratification.

A second major result of European contact has been the introduction of European languages themselves as lingua francas. For example, the dominant lingua franca of both the Western and

Eastern regions of Nigeria is English. The introduction of European languages was partly on the level of the "picking up" of more or less pidginized versions of European languages by the illiterate, who in the beginning, at least, used the traditional pidgin of the slave-trade period. At the same time languages such as English and French were being taught in mission and governmental schools, and have been in undisputed use for university-level education. These dual forms of European languages led to the denigration of pidgins, which became associated with illiteracy and, above all, with the colonial master-servant relationship. On the other hand, a full spoken command of standard English, French, or Portuguese is the sign of the African elite. Though nowhere, except in Liberia, is any European speech the first language of Africans, the ability to speak a European tongue becomes a supraregional, supratribal, even supranational mark of a new elite whose badge of membership is education, as proven by fluency in the European language employed in higher education.

Statements concerning the language situation of migrants are not very common in the literature. In general, it would seem, the migrant acquires a reasonably practical command of the dominant language of the area to which he comes. Thus Abdoulaye Diop informs us that of ninety-six Toucouleur (linguistically Fulani) in Dakar, ninety-one had learned Wolof, the language of the African inhabitants of the city.⁴ Again, Audrey Richards found that a knowledge of Luganda was sufficient in interviewing most of the migrants in Uganda.⁵ There are, however, exceptions. Skinner and others report that the Mossi migrants in Ghana normally do not learn the local language (usually one of the Akan group).⁶ The migrants from the north have a common linguistic bond in their own regional *lingua franca*, Hausa, and therefore tend not to associate much with the Ghanaians. This linguistic insulation, so to speak, considerably restricts the effect of migration on traditional tribal life. According to Skinner, "Even when the loud-speaker trucks of the various Ghanaian political parties visit the farm areas where most of the migrants work, the Mossi seldom understand the language being used."⁷

Language and Sociopolitical Groupings

Thus far, language has been considered mainly from the utilitarian point of view, as a means of communication. It is, however, more than that. Language is perhaps the most important single criterion of group identification, at least among groups sufficiently large to play a political role. For example, in Africa "tribe" is defined, with very few exceptions, in terms of first language. If a common language did not have this important function, we might expect that people who had learned a foreign *lingua franca* of wider usefulness than their tribal language would forthwith abandon their first language, or at least not bother to see that their children learned it. Of course, there are sources of tribal cohesion other than language, but Africans themselves are aware that the loss of their linguistic heritage would almost inevitably follow their loss of tribal identity. In interviews I conducted in the Plateau Province of the Northern Region of Nigeria, a highly multilingual area in which Hausa is the undisputed *lingua franca*, practically all informants with children said that they taught them their tribal language as their first language, and Hausa somewhat later. In the words of one informant, "If we abandoned our own language, we would become Hausa just like the rest." Pagans said that their ancestors would be greatly angered by the abandonment of their language. Several illiterate informants ventured the opinion that the language itself had a positive aesthetic aspect. There was, however, no hostility to the learning of Hausa. In fact, my informants expressed a unanimous desire for their children to learn Hausa because it was the medium of instruction in the lower grades and because ignorance of Hausa condemned a man to a restricted and economically marginal traditional agricultural existence.

We can think of linguistic continuity of a group in the urban environment as most perfectly maintained by group endogamy and the teaching of the tribal language to the children. Concomitantly, a *lingua franca* may be current in the group without producing any evident movement toward assimilation. Such a situation, called by linguists "stable bilingualism," has apparently existed in Timbuktu, as previously noted. The Tuareg and the Arabs have been bilingual for centuries, employing Songhai and their own language without loss

of ethnic identity or serious impairment of group membership. Tribal intermarriage on a wide scale, of course, tends to undermine this continuity. The evidence seems to show that up to now tribal endogamy has prevailed markedly over tribal exogamy in the urban centers of Africa. Systematic data seem to be lacking in regard to the language or languages spoken by the offspring of intertribal marriages, and in regard to the relationship of this question to tribal identification. As most people in West Africa are patrilineal, and as the bride price is interpreted as implying possession of the children by the father's group, we may conjecture that in most instances the child learns the language of the father, along with the language of the mother and sometimes an external lingua franca. Skinner describes the reluctance of the patrilineal Mossi to marry women of the matrilineal Ashanti, presumably because both groups would claim the children under native law.⁸

The phenomenon of "passing" is a more direct mechanism for changing group affiliation than is the use of children. The situation in Africa is quite the opposite from the passing of Negroes in the United States, where physical type, not language, is the problem. There is occasional evidence in Africa of such passing by the adoption of language, dress, and other distinguishing marks of tribal membership. Audrey Richards describes migrants in Uganda whose Luganda is good enough for them to pass by claiming ancestry in some other district and thus becoming members of a group with superior local prestige and economic possibilities.⁹ Banton describes how in Freetown, where non-Creole Africans are ranged in prestige in order of degree of adherence to Islam, members of the still largely pagan Temne tribe joined Mandinka and Aku (Yoruba) associations, and acquired the appropriate languages competently enough to pass into these groups. As Banton points out, however, an "African does not lightly renounce his tribe for another,"¹⁰ and a countermovement led to the formation of a Temne young men's association to avert further depletion of Temne tribal strength in Freetown. Although instances of this kind have no doubt occurred more widely in Africa than has been reported in the literature, in neither of these two, nor presumably in others, was the phenomenon of sufficient scope to result in the complete absorption of a tribal group.

The attitude toward the tribal language as against the lingua

franca is very different. The former is connected with a sense of group identity, of loyalty to traditional ways and to ancestors; the latter is a utilitarian instrument important—indeed, often absolutely essential—to getting ahead in the world, but not as yet setting up a real bond of solidarity.

It does not follow that the indefinite survival of tribal languages is thereby assured. Innumerable languages have become extinct in the course of the world's history. The preponderance of existing evidence from Africa, however, is that exceedingly few languages are in danger of immediate extinction, and any political or social planning that would count on the loss of tribal identity through the universal use of a lingua franca in the next generation, at least, is not realistic.

It is useful to draw a distinction here between tribalism as a political form based on a territory and marked by traditional customs and by political organization in terms of chiefly office, and the wider notion of group identity which, for want of a better term, I will call "ethnicity." Thus the Welsh are an ethnic group but not a tribe. It is entirely possible that the traditional tribal groupings of Africa are evolving toward ethnic groups of this kind, although it is clear that traditional tribal organization has, on the whole, shown remarkable resilience and adaptability. The tribe, as has been pointed out, may, through the medium of associations or tribal unions, re-create itself in urban centers and strengthen and maintain its ties with the rural hinterland.¹¹

Africans seem quite conscious of the mechanisms necessary for the maintenance of group identity. Rouch aptly compares the behavior of some tribal groups, with migrant members in cities or on farms elsewhere, with that of expatriate Europeans.¹² If indeed there is group endogamy, if the children are sent back to the villages after a certain age to learn the traditional customs and if the language is maintained, then, in effect, the emigrant groups become "colonies" in the original Greek sense. As long as distance is not too great for fairly continuous visiting and intermarriage, the prediction is that linguistic unity can be maintained indefinitely. Once the ties of fairly continuous communication weaken, the emigrant's

language will diverge and ultimately become unintelligible to the home group. This process has often taken place in the past in Africa, as elsewhere, but it requires centuries, not decades.

Finally, it should be noted that language may be the subject of conscious planning and policy. Until now, decisions on matters of language in Africa have been made either by missions or by colonial governments. The former, by choice of specific dialects as standard forms of a language, and of certain languages rather than others for use in instruction in mission schools, as well as by the orthographies they introduced, exercised a very real, if haphazard, influence. The very act of creating an orthography and using a language for literary purposes gives it a certain prestige and an attendant advantage in other situations. The influence was haphazard because decisions were habitually made without sufficient knowledge of the degrees and the kinds of dialectal variations, or of the attitude held toward the various dialects by those who spoke the language. The form of speech current near the mission station was normally chosen without any understanding of the long-term consequences. Mission influence on language may be called haphazard also because of the lack of overall interdenominational planning. Consequently we even have Protestant and Catholic forms of orthography for certain languages (e.g., Ibo).

The other important policy agent is government. The French policy of using French exclusively in education and administration has tended both to facilitate the spread of French as a *lingua franca* and to bring loss of prestige to African languages; the latter is a factor still to be reckoned with in areas of former French rule. On the other hand, the official recognition and use of Swahili in East Africa, particularly in Tanganyika, and of Hausa in the Northern Region of Nigeria, under British administration, have strengthened processes already at work tending to the spread of these languages.

The question of language, then, has more than local import. Because tribalism, as a basic political factor in Africa, is tied to the question of the survival of communities, each with its own peculiar linguistic heritage, the question of language becomes a fundamental one for the newly independent African states. A degree of linguistic

unity is a presupposition of European nationalism, occasionally violated but then always with some derogation of the feeling of national unity, as in Belgium, for example. In Africa, outside Somalia and the Malagasy Republic, this linguistic unity is lacking and, if the present analysis is correct, unattainable in the reasonably near future. Here I propose merely to point out that there is a problem of language in relation to nationalism, for it has ramifications that would take us far beyond the present topic.

Sociolinguistics

This brief review of what I believe to be the salient problems regarding the role of language in the urban and migratory situations of contemporary Africa should serve to emphasize the point made earlier, that relevant data on a good many essential topics are scarce. It may prove useful, in summary, to indicate the main aspects of the "language situation," the basic topic of investigation of sociolinguistics.

These aspects may be enumerated by means of a rough division on the basis of the disciplines that seem best equipped to handle particular problems. The purely linguistic factors include the classification of languages and dialects, judgment as to whether a language is to be considered a pidgin or a Creole, extent of vocabulary development, linguistic complexity as a factor in ease of learning for non-native speakers, and information regarding the existence of standardized literary forms and their relation to existing spoken dialects. The purely demographic aspect concerns the distribution of speech forms in the area under study, and the extent of multilingualism and literacy in one or more languages. Ideally, such information should be included in censuses. Until now, only first-language information has been available, but, in my experience, it has seldom been even reasonably accurate. Sociocultural facts concern the distribution of first and other languages in relation to occupation, social stratification, ethnic origin, and religious affiliation, as well as types and frequency of language choices for offspring from mixed marriages. The social-psychological aspect includes attitudes toward and prestige ratings of languages as might be indicated by attitude tests, semantic differential, and so forth. Of more individual psychological

import are the motives for learning new languages, and the manner in which they are learned. Africans pick up new languages without formal instruction, but we know almost nothing of the processes involved. Finally, a political aspect may be recognized. We may include here the policies of governments and private agencies in language matters, and the relation of language questions to political parties, national aspirations, and so on.

This essay is intended, of course, merely as a rough outline. It should be evident, however, that the language situation, taken in a broad sense, is a substantial part of what economists call the "infrastructure" of development. As such it is, I believe, at once one of the most important and the least studied factors in the contemporary African situation.¹³

NOTES

1. For an account of Timbuktu, see Horace Miner, The Primitive City of Timbuctoo (Princeton: Princeton University Press, 1953).

2. See in particular the study by Jean Rouch, "Migrations au Ghana (Gold Coast)," Journal de la Société des Africanistes, XXVI, no. 1-2 (1956), 33-196.

3. For examples of the treatment of sociolinguistic problems by linguists, see C. A. Ferguson and J. J. Gumperz, eds., Linguistic Diversity in South Asia (Bloomington: Indiana University Press, 1960).

4. A. Diop, "Enquête sur la migration Toucouleur à Dakar," Bulletin de l'IFAN, XXII, no. 3-4 (1960), 414. Some or all, however, may have known Wolof in their rural habitat.

5. See A. I. Richards, ed., Economic Development and Tribal Change: A Study of Immigrant Labour in Buganda (Cambridge, England: Heffer, 1954, p. 15.

6. Rouch, op. cit.; Elliott P. Skinner, "Labour Migration and Its Relationship to Socio-Cultural Change in Mossi Society," Africa, XXX (Oct., 1960), 375-399. Skinner adds (personal communication) that practically all Mossi who learn Ghanaian languages cease to maintain their Mossi tribal allegiance.

7. Skinner, op. cit., p. 295.

8. Ibid., p. 391.

9. Richards, op. cit., p. 176.

10. Michael Banton, West African City: A Study of Tribal Life in Freetown (London: Oxford University Press, 1957), p. 165.

11. See in particular Kenneth Little, "The Urban Role of Tribal Associations in West Africa," African Studies, XXI (1962), 49.

12. Rouch, op. cit., p. 151.

13. The following statement in the Report of Working Group 4, Third Leverhulme Conference, University College of Ibadan, 1962, p. 1, apropos: "The problems need to be investigated from all angles: many which on the surface seem linguistic, there are close ties with other subjects, and conversely the linguistic situation in most countries is such that practically all problems of development have a linguistic aspect."

Probably everyone, while reading a historical narrative with its neat division into periods, its crises and its transitions, must have wondered at some time or other whether the actors contemporary to the events could have sensed these divisions. Did the contemporaries of Charlemagne, so to speak, know that they lived in the Carolingian period? But it requires no great historical sense to realize that in all probability future historians will see 1960 as the year which definitely marks the end of a chapter in African history, the domination of Colonialism, and the beginning of a new one, that of an Africa of self-governing states. It is not accidental that the first international congress of African studies should have been held so soon after these events and in a country which set the pace for these developments in Subsaharan Africa.

It seems appropriate therefore, for those of us who are engaged in the scientific study of Africa, to utilize this occasion to review what has happened in the past in our particular field of specialization in order to comprehend our present status and anticipate our future prospects.

The history of linguistic studies, like that of other aspects of the scientific enterprise in Africa, is still largely lacking. Since so much remains to be done, and given also the limitations of a single presentation, what will be presented here is necessarily fragmentary and partial. The more distant past has the no doubt deceptive appearance of greater simplicity. At any rate the documentation in this case is far less abundant and the actual volume of linguistic work accomplished is, of course, far less. I shall therefore discuss the period up to approximately 1910 in

some detail, while for the more recent events I shall abandon the narrative style and present in rather summary fashion the chief developmental trends and then outline some of the main tasks which lie ahead for linguistic research.

Linguistics in Africa, like other aspects of the scientific study of things African, has up to now been carried out predominantly by western scholars, and on models developed in the West, i.e. in Europe and the United States. This does not mean that the role of Africa itself has necessarily been a passive one. What we must bear in mind is that linguistics itself developed as a science during the very period with which we are concerned. The linguistics of today is probably thought of by scholars in other disciplines as a highly developed and somewhat esoteric study requiring arduous specialised training. It brings to mind the instruments of the phonetic laboratory, the esoteric terminology and quasi-algebraic symbolisation of many contemporary descriptive grammars and the arcane methods of comparative linguistics. But, of course, little of this existed when Koelle in his Polyglotta Africa of 1854 presented us with the first comparative set of vocabularies of African languages to be compiled by a uniform method and with a uniform transcription. But even this was the fruit of at least half a century in which classical articulatory phonetics was gradually emerging as an exact science. If we go back to 1800, the very concept of a science of language does not yet exist, yet almost two centuries have elapsed since the first African language studies of Job Ludolfus, Father Brusciotto and other pioneers of the seventeenth century.

The fact is, then, that we do not have, as it were, a straight line development in which a well-organized set of previously developed techniques are simply applied to the subject matter on a wider and wider scale as more and more data accumulate, but rather a complex process of interaction by which the very bases of linguistic science were being developed in response to problems presented by the data themselves. And among these data, those from non-Western languages, among which African languages figured prominently, constituted a peculiarly crucial and challenging set, since they posed questions which would not have come out of materials

drawn exclusively from languages which were similar in relationship and linguistic type to those spoken by the investigators themselves.

Thus far, the relations that have been considered are, as it were, internally linguistic. The questions concerned the relationship between linguistics as the science of language and the specific area of African language studies. But to understand the development of African linguistics, there are other relationships which must be taken into account. If, on the one hand, African linguistics must be put into the context of general linguistics, on the other, it has been a part of the overall scientific effort in Africa and as such much of its development can only be comprehended by reference to the characteristics of Western contact with Africa which has, of course, differed very significantly in different periods and different areas.

For all practical purposes we can say that significant knowledge of the languages of Subsaharan Africa begins in the seventeenth century. We can distinguish an initial stage of African language research coincident roughly with the seventeenth and eighteenth century while certain developments of decisive importance justify us in considering the time span 1790-1810 as transitional to a new period of African studies in the area of language.

The humanistic interests of the Renaissance and the broadening knowledge of the world as a whole resulting from the voyages of exploration had produced in Europe by the seventeenth century a general attitude of curiosity about man in all his varieties that had, as one of its facets, an interest in the language of non-Western peoples. This attitude is in marked contrast to that of the ancients in such matters. The Arabs had displayed some interest in African languages and cited individual words but never collected vocabularies or wrote grammars or dictionaries. In the seventeenth century, we have for the first time not only extensive word lists, but detailed grammatical and lexical studies of individual languages. Some but by no means all of this was more or less directly related to Portuguese missionising and colonising activities. The range of languages available for study was, of course, severely limited by the nature of the contact during the period. The recording of sound

was, naturally enough, highly impressionistic and based on the apprehensions of sounds in terms of the sound system of the observer and using an orthography based on that of the language of the investigator. Under certain circumstances, however, surprisingly accurate results were attainable. Thus, as Nienaber has recently pointed out, Herbert, a British observer who published his results in 1643, distinguished consistently certain clicks in Hottentot though, of course, the theoretical knowledge necessary to give an account of these differences in physiological and acoustic terms was lacking. This achievement of Herbert then must be attributed to unusual natural ability in distinguishing sounds. In at least one area, however, an indigenous analysis already existed embodied in an established orthography. This region was Ethiopia with its alphabet based on the Sabeian script in South Arabia. To begin with, this alphabet, like its Phoenician congener, indicated only consonants, but the Ethiopians invented a method of indicating vowels by varying modifications of the basic consonantal symbols. The nearly phonemic orthographies which resulted for Geez and Amharic were of great assistance to Job Ludolfus, whose work on these languages was an outstanding achievement. Indeed, these works and Father Brusciotto's grammar of Kikongo, the other outstanding work of the period, were to remain unequalled until well into the nineteenth century.

For grammatical description the student of African languages during this period suffered under somewhat less severe handicaps than in the recording of sounds. He could draw on two traditions: the classical, based on the works of Greek and Roman grammarians which had already formed the bases for the pioneer grammatical analysis of vernacular languages of Western Europe, and an oriental tradition, known to European scholars from Arab and Jewish sources and providing an appropriate framework for the study of languages of the Semitic type. However, for the vast majority of African languages, neither of these models sufficed. The difficulties encountered were really parallel to those mentioned earlier in relation to phonological studies. The training of the observer predisposed him to interpret the phenomena of strange grammatical systems in terms of familiar but inappropriate categories. Here again Ludolfus was fortunate in comparison with his

contemporary Brusciotto. Ludolfus was an accomplished Semitic scholar with a thorough knowledge of Hebrew and Arabic. He was able, therefore, to organise his grammar along familiar lines. Indeed his grammar of Geez in particular does not suffer greatly in comparison with quite recent grammatical works on Semitic languages, such has been the conservatism in this area.

The task faced by Brusciotto in his grammar of Kikongo was, as we have seen, much more difficult. There was neither an indigenous orthography nor a suitable grammatical model. The most obvious problem was the Bantu noun-class system. Brusciotto treats the prefixes as articles after the manner of Italian. Although he has no clear statement of agreement between nouns and other parts of speech in respect to noun-classes, he does enumerate the classes correctly and notes with accuracy the pairings of singular and plural classes.

Struck by the fact that the markers of class precede rather than follow, as with the suffixed markers of case and gender in European languages, he called them principationes, 'beginnings'. In spite of his defects then, Brusciotto has shown how an alert mind may succeed in transcending a traditionally given frame of reference and in forging new concepts. The magnitude of Brusciotto's achievement can be assessed from a comparison with Cannecatim, 150 years later, who failed to produce any order in the complex system of Bantu noun-classes.

During the eighteenth century there was a gradual increase of our knowledge of African languages, but it was not markedly superior in quantity to the seventeenth century, while in regard to quality nothing was produced which equals in value the pioneer works which have already been mentioned.

However, the years immediately preceding and following 1800 are marked by new impulses in African and general linguistics, the first real stirrings of interest in comparative studies. This new chapter in linguistic investigations was partly due to the opening up of the interior of the continent which began with the explorations of Bruce, Park, Salt and others and which had as a

to product the collection of vocabulary data from numerous hitherto uncontacted languages. The accumulation of such data from all over the world became indeed a fashion of the times, beginning with the *Glossarium Comparativum Linguarum Totius Orbis* of 1787 sponsored by Catherine the Great and containing data from thirty African languages in the revised editions of 1790 and 1791.

The publications of the period are not confined to mere collections. The very act of vocabulary comparison on a wide scale led inevitably to the noting of similarities and dissimilarities and to the framing of hypotheses to account for them. Thence arises the notion of languages as forming families based on common origin, the master conception underlying the systematic development of comparative linguistics which begins in this period. The celebrated statement of William Jones in 1786, regarding the relationship of Sanskrit, Greek, Latin, Gothic and other languages to form an Indo-European unity is usually cited as the decisive step inaugurating the modern period of comparative linguistics. This is a just statement insofar as Jones' hypothesis formed the basis for the first application of the comparative method in the work of Rask, Bopp, Grimm and the other founders of comparative Indo-European linguistics in the earlier part of the nineteenth century. However, that this general idea was already in the air can be shown particularly in the precocious activities of William Marsden, who in 1778, from material gathered from a Makua slave in Mozambique, deduced the relation between East African languages and Kikongo, thus foreshadowing the existence of the group of languages later to be called Bantu. In 1781, five years before Jones' statement, Marsden, from linguistic material assembled during Captain Cook's voyages, came to a clear concept of a Malayo-Polynesian family extending from Madagascar to Easter Island. Marsden's statement of 1783 is indeed quite modern in its conception and, it seems fair to say, superior in clarity to Jones' more celebrated pronouncement,

. . .that general language which is found to prevail and to be indigenous to all the islands of the eastern sea; from Madagascar to the remotest of Captain Cook's discoveries, comprehending a wider extent than the Roman, or any other tongue yet boasted.

The importance of the collection of comparative vocabularies in stimulating hypotheses concerning language relationships has been mentioned. Such hypotheses were pursued eagerly during this period because of the light they might shed on the problem of the origin and dispersal of mankind and the accompanying controversy concerning the monogenetic and polygenetic theory of human origins. The interest in the problem of relationship in turn led to the further production of large-scale comparative vocabularies. By far the most important of these and a true landmark in African linguistics is the Polyglotta Africana of Koelle, published in 1854. Unlike other works based on secondary collections which varied in methods of transcription and general reliability, Koelle, who compiled his list from freed slaves in Freetown, used a standard word list and a uniform method of transcription based on the as yet unpublished system of Lepsius, which first appeared in his Standard Alphabet of 1858. This latter work is also of great significance in the history of linguistics, and in particular African linguistics. For it showed that the new science of phonetics had reached the point at which a standardised system for representing sounds based on an analysis of the articulatory processes of speech was possible. This development of phonetics was to a great extent independent of Indo-European comparative linguistics, based chiefly on work with written documents, and was carried out by different men. Moreover, this work was largely stimulated by the demands of men working at specific languages. The state of development of African language study had now reached a point where individual unco-ordinated orthographic decisions, based on the differing orthographic practices of European languages, could no longer be tolerated.

Not only did the interest in non-Western languages provide much of the impetus for the development of phonetics but, at this time when phonetics was still in its infancy, those in contact with language problems in the field frequently had at least as much to impart as to learn. Indeed the line dividing the specialist from the non-specialist was a thin and uncertain one.

This situation can be documented in the important matter of tonal distinctions in African languages. The vast majority of African languages are now known to be tonal and tonal distinctions

were of particular importance in many of the West African languages which were among the first to be studied. In spite of the fact that the phenomenon was long familiar in the case of Chinese, contemporary phonetic theory provided no framework for the recognition and analysis of tonal systems. Tone is not indicated by Koelle in his *Polyglotta* nor is it found in Lepsius' *Standard Alphabet*. However, in this latter instance it seems probable that it was ignored because Lepsius did not think that it needed to be indicated in practical orthographies.

In fact, tone seems in the initial stages to have been noted by native speakers of African languages or to have been brought to the attention of European investigators by African informants. Probably the first example of the recognition of tone is in a translation into Ga of the gospels of Matthew and John published in 1843 and composed by A. W. Hanson, a mulatto who was a native speaker of Ga. Bishop Crowther, himself a Yoruba, was a pioneer in the recognition of tone not only in his native Yoruba but in other African languages. The true founder of African tonal studies, however, is J. G. Christaller who, in his studies of Twi, first put tonal analyses on a firm basis. Christaller himself tells us that his attention was first drawn to the subject by an African. In his own picturesque figure, 'Frueher war es in dieser Hinsicht, als ob wir bei Nacht in Tropenlande reiseten und uns die Umgebung unbewusst gleich einer europæischen dachten'—'Earlier, it was, in this respect, as if we journeyed at night in a tropical land and unconsciously thought our environment similar to a European one.'

How great the distance which was traversed during this eventful half-century can be appreciated by comparing the remarks of Lichtenstein in 1808 concerning the 'difficulty of giving someone else the means of learning a crude language. . . and become the grammatical teacher of a truly ungrammatical language' with those of Koelle in 1854 who saw in the complexities and subtleties of the Kanuri language of Bornu in Nigeria a proof of the full humanity of the Negro:

We confidently invite every man who can see
in language the expression and counterpart of the

mind to an examination of the Bornu grammar, and ask whether the richness of its inflection, the precision in its use of forms and its whole vital organism is not an incontestable demonstration that the mind of a people, which daily weaves for its appearance so fitting and so artful a garb, must be allowed to claim fraternity with ours.

The decade 1860-70 was marked by a number of significant developments and may be considered another turning point in the history of African linguistics. These events were the appearance of the first comparative grammar of Bantu by Bleek in 1862 and the first detailed overall classification of African languages by Lepsius in the appendix to the second edition of Standard Alphabet in 1863. This was followed in only a few years by the first version of its chief rival, that of Friedrich Mueller published in 1867. These and subsequent classifications provide rich materials concerning ideological tendencies in the approach to African data to which only brief allusion can be made here. Thus Lepsius, following in this respect the earlier reflections of Bleek, conceived of the fundamental distinction between African languages as lying in the existence of sex-gender in the Semitic and Hamitic languages on the one hand, and noun-classes of the Bantu not involving sex-gender on the other. Bantu in his view thus became the prototype of African languages, while Semitic and Hamitic were ultimately to be linked with Indo-European as the Japhetic branch of a Noahite linguistic family. We know today, and indeed some of the evidence was already at hand in Lepsius' day, that sex-gender is neither as unique nor as stable a characteristic of language as had been assumed. The superiority of sex-gender languages, espoused by Meinhof in a later version of the classification of Hamitic languages is stated in the following terms:

It cannot be denied that all higher ethnic possibilities of development must derive from a more ethical foundation which primarily, if not exclusively, finds its expression in the family. Now the family principally rests on the distinguishing and separation of the sexes and their predominantly moral regulation and distinction in marriage. It is here,

I believe, that we must seek the psychological reason for the linguistic distinction of gender which is confined to these three linguistic stocks.

The remainder of the nineteenth century and the early years of the twentieth were marked by steady growth of descriptive knowledge, both quantitatively and qualitatively. Classificational problems were temporarily in abeyance as it became apparent that in spite of the great increase in descriptive knowledge, many African linguistic phenomena remained for investigation. During this period, professionalisation greatly increased and for the first time systematic efforts in the linguistic training of missionaries and professional linguists with a primary regional specialisation in Africa were undertaken. By now, scientific phonetics and methods of teaching had advanced to the point where this could provide vital assistance to those who studied African languages. In other words, there was now a significant difference in the results obtained by trained as against untrained observers. Another sign of growth during this period was the founding, in 1887, of the first journal devoted to African languages, which made its appearance in Germany.

In comparative linguistics, by far the most important contribution of the time was that of Carl Meinhof whose comparative phonology appeared in 1899 to be followed seven years later by the first edition of his comparative grammar. These works still form the basis of Bantu linguistics. For the first time the concept of sound correspondence was systematically employed and original Bantu forms were reconstructed. An important part of this work was the extensive set of reconstructed noun, adjective and verb roots which accompanied it.

The publication of two important works within a year of each other, Diedrich Westermann's on the Sudanic languages (1911), and Meinhof's Die Sprachen des Hamiten (1912) signalled a revived interest in problems of classification. In the first work, Westermann sought to establish a far-flung Sudanic stock embracing practically all the vast variety of languages that could not be assigned to the relatively well-established Semitic, Hamitic, Bantu, or Bushman groups. This work, like Meinhof's comparative

Bantu, employed sound correspondences and reconstructed original forms. Meinhof, in his work on the language of the Hamites, sought to extend the membership of this family beyond more or less traditional bounds to include, for example, Fulani, Hottentot and Masai, all cattle peoples. The theory had undeniable overtones of Hamitic racial superiority. He did not find it possible to reconstruct original forms, as he had done for Bantu, because of the very small proportion of vocabulary resemblances found among some of the languages. Although the five-fold scheme which emerged from Meinhof and Westermann's investigations of this period (Semitic, Hamitic, Sudanic, Bantu, Bushman) was for long the standard one, it did not remain unchallenged during its period of dominance. In particular, Meinhof's assertion regarding the Hamitic affiliations of certain languages encountered opposition, most sharply, though not exclusively, by French linguists. Further, Westermann himself in his later work Die Westlichen Sudansprachen und ihre Beziehungen zum Bantu, limited his earlier notion of a general Sudanic unity to the languages of West Africa and the relation of this more restricted group to Bantu was, in effect, asserted. Indeed, ideas of this general nature had been current much earlier in the writings of Norris, Latham and Bleek. Sir Harry Johnston, in his monumental work on Bantu and Semi-Bantu (1919-20), had treated many of the West African languages as affiliated with Bantu (i.e. his 'Semi-Bantu'). In spite of these and other dissents, the two works cited earlier mark an epoch and taken together they rendered the earlier classifications of Lepsius and Mueller obsolete and ushered in the modern period of classification.

Passing mention may be made at this point to two other classifications of the period following 1910. One of these was that of Albert Drexel who brought African linguistic stocks into consonance with the ethnologic conclusions of the Kulturkreislehre (Culture-Historical School) but only gained limited currency, restricted to members of this school. The other is that of the well-known French Africanist M. Delafosse, who grouped Negro-African languages into 16 branches in his chapter of Meillet and Cohen's Les langues du monde (1924). In contrast to Meinhof, Hamitic was reduced to a minimum of Berber, Egyptian and Cushitic, and all other non-Semitic non-Khoisan (i.e. not Bushman or Hottentot) languages were treated

as forming a single vast Negro-African family. In addition to the 13 non-Bantu branches enumerated in his article, Delafosse evidently considered that Bantu also was part of this Negro-African unity. Mlle. Homburger, starting in her earlier work from this same notion of a single Negro-African family, ultimately espoused a theory of Egyptian and even Dravidian origin. Although this theory has found some echoes in current theorising by non-linguists, it seems to have acquired no real adherents among scholars professionally concerned with the study of African languages.

In descriptive method, the period subsequent to 1910 saw increased application of methods of phonetic science to the analysis of African languages. The tonal studies of I. C. Ward (Efik 1933, Ibo 1936, Yoruba 1938), the numerous grammars and dictionaries of R. C. Abraham beginning with his collaborative study of Hausa with Bargery in the 1930s and the remarkable phonetic study of J. M. Beach on Hottentot (1938) introduced a new level of phonetic accuracy and painstaking detail. However, these and other works of the period between the ends of the First and Second World War, in accordance with the usual time gap, between theoretic developments in the centres of research and their application in Africa, show little evidence of the new structuralism in linguistics or the key concept of its initial period, the phoneme. In grammatical analysis, however, C. M. Doke was a pioneer in seeking to develop grammatical categories which would more accurately reflect Bantu linguistic structure than did those of traditional grammatical analyses. His work, in a manner, independently paralleled that of J. H. Greenberg's even earlier concern with the functionally relevant categories of Amerind languages. Structural methods in phonology began to be applied mainly after the Second World War by American structuralists such as Welmers, by members of the London Firthian school and by certain other linguists, most notably a group of Belgians.

In the period following 1910, the completion of the effective occupation of Africa by the colonial powers brought with it a need for information regarding local language distributions and in certain situations a demand for knowledge of these languages for administrative purposes. In particular, the policy of Indirect Rule in

certain British-administered areas had a linguistic corollary. The use of African languages in educational systems in which government as distinct from traditional mission effort was assuming an increasing role, and the official status given to certain languages, e.g. Hausa and Swahili, created a demand for systematic linguistic research and for language instruction. These tendencies were by no means limited to British areas but were perhaps more pronounced here because connected with an explicitly formulated policy. In this connection such research institutions as the School of Oriental and African Studies of London, the Institut Français d'Afrique Noire at Dakar and others were organised during this period, all with a major emphasis on African linguistic research and teaching.

The political events of the period following the Second World War, particularly the sweeping decolonisation which reached its climax in 1960 and 1961, has had as yet minor repercussions in the field of African linguistics. The rapidly increasing United States involvement in Africa as in other areas produced the need for practical language instruction with its correlates of efficient instructional material based on research and the training of linguists specialised in African languages. Alongside the still vigorous and ever-increasing efforts of former metropolitan powers, the Soviet Union and other Eastern European states have significantly expanded their facilities in this area. As in other scholarly areas, African activity is beginning to make a significant impact. The efflorescence of African interest in things African, as evidenced by the founding of programmes of African studies in African universities, and the demand for a place for African languages in the curriculum, is producing a demand for linguistic specialists which cannot but stimulate the scientific study of African languages by African scholars in the immediate future. We have indeed already Africans who have mastered the difficult techniques of modern linguistics.

It is evident that our knowledge of African languages since the seventeenth century has been advancing at an ever-increasing pace, that there has likewise been great progress in methodological sophistication, yet given the richness and complexity of African languages we are in a sense still at the initial stages. In part we

require the extension of already well-developed techniques on a scale comparable to their employment in Western areas. Beyond this, however, African facts often constitute a challenge to theories elaborated by Western scientists in a Western setting, and therefore a stimulus to the development of new cross-culturally oriented methods and the formulation of generalisations valid for all areas. It is to be hoped that the growing scholarship of Africa and Asia can here make essential contributions.

In the light of these factors, some of the major desiderata for further linguistic research in Africa may be indicated. In Africa, in language as in other fields, in spite of the large efforts already made, we still lack in many instances the most elementary information of all, the geographical distribution, degree and type of dialect variation and population statistics of individual languages. In descriptive linguistics, the number of first-rate grammars and dictionaries, even of major languages, is still not in any way equal to our knowledge of comparable phenomena in Europe. The more advanced and specialised studies of particular syntactic phenomena are very nearly lacking. Such studies are, of course, in special relation to the technical study of African literary style which has barely begun. Again, the technique of dialect geography, so highly developed in Europe and the United States, has received only marginal application. The descriptive data asked for here, it should be pointed out, are not only fundamental to linguistic studies as such, particularly comparative studies, but are also of great practical importance as providing the bases for intelligent policy formulation towards linguistic-tribal groupings, and the development and implementation of educational planning. The large contributions, past and present, of relatively untrained investigators, particularly those connected with missions, have been repeatedly mentioned. The level of professional competence of such workers has risen greatly in the recent past. The increase of systematic advanced training for such linguistic workers is therefore of great potential value. The archiving of existing, but only locally known, material and the exploitation of local knowledge of linguistic distributions can add greatly to the store of generally available knowledge in the areas just mentioned.

In comparative linguistics, as has been evident from the foregoing review, only Bantu studies have received a development at all comparable to that of historical linguistic studies elsewhere. There has also been some comparative study, of a preliminary nature, regarding a few more restricted groupings, notably the Mande group of Niger-Congo and Nubian. Westermann's etymologies in his work on the western Sudanic languages mentioned earlier, in conjunction with the large amount of etymological work already accomplished in Bantu, can serve as a preliminary for comparative Niger-Congo studies. In Afro-Asiatic (Hamito-Semitic), the relatively high development of comparative Semitic studies and Semitic-Egyptian comparisons provides a framework for the historical study of the entire family. In particular, the further extensions in our knowledge of the numerous Chad languages, of which Hausa is the best-known, promises to widen significantly the basis of comparative Afro-Asiatic studies. Here and elsewhere, the greatest need is for large-scale phonologically accurate dictionaries as the foundation of etymological studies.

In the virtual absence of early documentation of African languages (ancient Egyptian, Old Libyan (Berber), Meroitic, medieval Nubian and Geez are almost the only exceptions), early European transcriptions and the records of African languages spoken in the New World can contribute to historical studies. Here almost everything remains to be done. It is likely that a certain amount of as yet undiscovered sources of this kind exists. That there are still materials not yet edited or otherwise made generally available to scholars is known.

Even in the present state of historical linguistic knowledge, there exists the possibility of applications to specific culture-historical problems on a much wider scale by the careful application of reliable techniques. Linguistics is here in a position to make important contributions to our knowledge of African history. Glottochronology up to now has been applied on a very limited scale to Bantu problems and to the question of the date of separation between Malagasy and the other Malayo-Polynesian languages. Provided it weathers its present crisis, it can provide key information. Even without glottochronology, much can be done in the

methodologically well-developed area of the study of loan-words and the cultural contexts of proto-vocabularies, to replace the free-wheeling speculation regarding ethnic and place-names which, in the past, has unfortunately formed nearly the sum total of linguistic contributions to African history.

All of the areas just mentioned come, by and large, under the rubric of the application of well-attested techniques to African subject matter. It is particularly in the inter-disciplinary areas such as psycholinguistics and sociolinguistics where in many instances problems are still not as yet clearly formulated and techniques for the most part undeveloped that the challenge to creative thinking is greatest and where African problems can play an essential role. We may cite here but a few randomly chosen possibilities. Word association techniques have thus far only been applied to a very few languages and not at all to African languages. There is here not only the question of specific associations, but the role of grammatical classes in associations; the study of African noun-class systems here opens up new possibilities. Again, various psychological tests have been devised in the course of a project of the Social Science Research Council in the southwestern part of the United States, and applied to monolingual and bilingual speakers of American Indian languages, Spanish and English in order to probe the possible effects of linguistic structure on psychological processes. Similar or newly designed tests could be applied in the African situation. In sociolinguistics, detailed studies of the social and political role of first languages and auxiliary languages, social-psychological measures of attitudes towards different languages and the degree and type of multilingualism in the rapidly growing and ethnically complex urban centres of Africa, are but a few of the topics that might be mentioned.

The work already accomplished in the study of African languages, extensive as it is, is thus hardly more than a preliminary sounding into the depths that remain to be penetrated in the vast world of African languages.

Ours is an association* organized on an areal basis. What we have in common is an interest in a particular portion of the earth's surface. Yet every member of the society, whether a practicing academician or not, bears an affiliation of a different order, namely, membership in one of the standard academic disciplines—sociology, history, anthropology, or some other. This is formally acknowledged by the placing of an appropriate letter abbreviation after each name in our membership list, and it can normally be assigned without hesitation. The latter basis of group identification, that of discipline rather than area, seems in a real sense to be primary. It is older and better established, and, above all, it supplies the very framework of American academic organization, that into departments which normally are distinguished along the lines of division of the disciplines.

True, there are programs of African studies in a number of universities, just as there are other programs, both areal and nonareal. But after a period of initial enthusiasm in some quarters following World War II for the training of areal specialists as such and without primary reference to traditional disciplinary affiliation, it became evident that if a scholar was to be, for example, an Africanist and a sociologist, he should receive his higher degree in a sociology department. He would thus be a sociologist in the broadest sense of the word, but one with a special interest in Africa rather than an Africanist with a greater interest in the sociological than the other aspects of African life. Area study programs thus failed to shake the fundamental organizational basis of American academic life. In fact, today most African programs are inter-

departmental as well as interdisciplinary and their staff members are usually at the same time members of established academic departments.

From the point of view of the scientific justification of area studies, this lack of organizational autonomy cannot but disturb us. We tend to believe that the administrative organization of the university reflects, even if only approximately and at some remove, the requirements of the quest for knowledge itself. Thus the academic division between physics and chemistry is in conformity with the scientific theory of the existence of atomic and molecular levels of matter. The division is inconceivable without the theory and did not exist prior to it. Hence the organizational facts about area programs described earlier throw some doubt on the scientific coherence of such areal specializations as African studies. And in making such a negative case, a cynically minded critic might well assert that it was the combined prodding of the government and of private foundations which forced area programs on reluctant universities whose scruples were to be overcome only by the irresistible lure of liberal subsidization. Such a critic could point out that no university supports an areal program without such outside assistance, whereas it would never think of dispensing with, say, its English department in the absence of such support.

While there is some truth in this, nevertheless I shall try to point out that there are, comfortingly enough, other fundamental factors at work which would have tended to the development of areal interests as matters of scientific concern even had there been no extra-academic stimulus of the kind mentioned. I shall also seek to show that even though its ultimate organizational form may not take that of the traditional departments, there is hidden by this surface calm a far-reaching realignment of the subject matters and approaches of the various humanistic disciplines so revolutionary in its nature that it is bound to attract the attention of future historians of science.

Let us consider the principles which formed the basis of the scientific division of labor among the humanistic disciplines as

it obtained, say, about 1945 at the conclusion of World War II. We would like to think that the division of the sciences reflects in some reasonable way the nature of the world to be investigated rather than the presumably fortuitous circumstances of time and place at which the studies themselves arose. However, at least in those disciplines devoted to the study of man, this degree of Olympian detachment did not obtain then nor does it now. Given the specific alignment of the humanistic disciplines in our period of reference, it would not have required a particularly shrewd Martian observer (and we know that all Martian observers are shrewd) to detect that these disciplines arose in the milieu of Western civilization. Moreover, the facts on which such a conclusion would be based applied equally to the social sciences and the humanities regardless of the profound cleavage which separated them in other respects.

If the total range of human societies is contemplated with the detached view of such an outside observer, it would appear that there was an overall threefold and very unequal division among the disciplines devoted to the study of man. And this division varied inversely with the number and geographic spread of the societies to be studied: the greater the number and the wider their geographical distribution, the fewer the number of disciplines engaged seriously in their study.

In the first division belong a number of disciplines which we may call topical, such as economics, political science, linguistics, and musicology. These, whatever their theoretical claims regarding universality of interest, were in fact nearly exclusively devoted to their particular specialty in Western European and Western European-derived societies. They all contained, it is true, subdivisions devoted to comparative studies, but these were in general minor in actual importance and stunted in development. Thus it seems to me not unfair to say that by comparative government was meant the comparative study of such Western or Western-derived constitutions as those of England, France, and the United States. In bolder flights, the governmental institutions of such countries as Bulgaria might be drawn in, but beyond this the imagination rarely ventured.

The disciplines comprising the second set were more

frankly areal and fewer in number and importance than the first. Under this second rubric may be included the disciplines which had as their subject matter some particular non-Western civilization, e.g., Sinology, Indology, Islamic studies. Unlike the topical disciplines of our first division, these fields theoretically encompassed all aspects of the life of the societies they studied. Finally, the third division consisted entirely of a single discipline, anthropology, which in theory was concerned with all the remaining societies on earth and in all their aspects.

However, even the unequal division of the disciplines among these three main categories does not do full justice to the extent of the ethnocentrism involved. One might have thought, given the vast scope of the tasks assigned to anthropology, that it would be the largest of the humanistic disciplines. But, in fact, it was among the smallest. With pitifully weak forces it sought to include in its subject matter the majority of the world's societies in all aspects of their social life.

It could not have escaped notice, in this cursory review of the academic division of labor, that the basic threefold classification set forth here corresponds as much to the type of society as to the geographical area. The topical disciplines investigated specific aspects of industrial societies. The Orientalist disciplines had as their subject matter nonindustrial societies with a literate historical tradition in depth. Anthropology studied tribal societies. Naturally enough, each of these three divisions tended also to develop a distinct approach and methodology in consonance with the type of society which was the object of its study. With the important exception of history, which in spite of the attempts at developing a "scientific history" has remained substantially devoted to its humanistic heritage, and the partial exceptions of such fields as musicology, the topical disciplines were oriented to a social scientific approach which emphasized the use of quantitative data, controlled observation, and the search for lawlike regularities underlying the great surface diversity and complexity of the social realm. They tended also to a relative lack of interest in the historical development of the phenomena with which they were concerned.

The Orientalist fields, dealing as they did with literate civilizations, tended to be historical, humanistic, and philological in their approach. Anthropology, finally, combined the social scientific and the humanistic approach. On the one hand, being usually concerned with small-scale societies, it tended to be non-quantitative in its methodology, and, on the other, in the absence of literate traditions, it often made, in a kind of sour-grapes reaction, a functionalist virtue out of the presumed necessity of dispensing with historical documentation.

The present contention is that the economic, social, and political changes of the period following World War II in the previously nonindustrialized areas are in process of producing fundamental and irrevocable changes in the previously established division of labor among the disciplines and that the rise of area studies is an important symptom of these changes. Although such developments were often initiated or accelerated by nonacademic agencies working against the well-known inertia of educational institutions, they were but the agents of the transformation which, in any case, was not artificial but the inevitable outcome of the new world situation as reflected in the purely scientific tasks of the established disciplines.

What has occurred is that the momentarily stable conformation of the three divisions discussed earlier, determined as much by societal type as by geographical area, has been undermined by a change of type in the societies themselves. Thus, a political scientist, even if he considers his chief object of study to be national states, cannot disregard the newly born nation states of Africa and Asia. Moreover, in the investigation of these emerging entities, he discovers that if his studies are to be realistic he must take into some account the motive forces inherent in indigenous institutions which previously had been the sole province of the anthropologist.

There are, I believe, two main facets of the changes being undergone by the traditional disciplines as a result of the new attention brought to bear on areas such as Africa. One has to do with the relation between the topical disciplines and anthropology, and the other has to do with historical change as an object of study. All the other disciplines now becoming concerned with Africa are,

as it were, in a process of being at least partially anthropologized, in the sense that extension of interest to non-Western areas and the growth of serious comparative studies can no longer be delayed. On the other hand, they inevitably and often quite correctly apply techniques and investigate problems which are not prominent in the anthropological heritage. Anthropology itself, threatened with the ultimate extinction of its traditional subject matter, extends its methods, liberally borrowing from others, and, for example, selects local communities and treats them as quasi-tribes. Moreover, even as early as the 1930's it began to focus its attention on changes in the tribal way of life under the impact of industrialization and thus staked out for itself a presumably durable subject matter.

The second aspect of these changes has been mentioned above in passing. Both the topical disciplines and anthropology, which had tended for somewhat different reasons towards static approaches, now find themselves forced, willy-nilly, into the study of dynamic processes of historical change.

As each of the traditional disciplines enters on hitherto untrodden paths, it is forced to re-evaluate its goals and its relationship to the other disciplines. We are but in the initial stages of this development, the pioneering generation as it were. For what must be the effect on the ethnocentrism of the social sciences and on their traditionally defined tasks and division of labor when new academic generations of scientists native to other parts of the world begin to rival or surpass in number and quality those of the Western world, as must happen in the not unforeseeable future?

Although the traditional disciplines have, in all probability, a rational foundation transcending their contingent base in the Western world, the explosive growth of areal research, now but in its initial stages, must produce a fluid situation in regard to their historically defined tasks. This is the justification for the existence of an association such as ours. For without the interdisciplinary contacts which it facilitates or even initiates it has no real *raison d'être*. If, for example, the Africanist economist need only talk to other Africanist economists, this can be more expeditiously done within

the framework of organizations of professional economists and requires no such organization as the African Studies Association.

I propose then, as a linguist by profession, to discuss the prospects of African linguistic studies with this background in view and trust that what I will say will be of some interest to the majority who are not linguists. I will seek to accomplish this by introducing, in their African setting, problems of common interest to linguistics and certain other disciplines. Given the limitations of time, such a review will necessarily be incomplete in that certain areas of possible collaboration will be ignored and that the treatment in each case must be cursory. The fields intended for discussion are culture history, sociolinguistics, psycholinguistics, and literature.

The methodologically unsettling and stimulating effects of the extension of traditional interests to encompass Africa are perhaps nowhere more obvious than in history. The issue at stake is the legitimacy and the desirability of the application of a variety of other approaches in the reconstruction of Africa's past than the conventional method of history, namely, the use of written documents. Thus in regard to oral tradition, one of the less conventional methods, we have the diametrically opposed statements of two historians--Robert Cornevin in the Journal of African History, who talks of the "seule source reconnue valable par les historiens professionnels, l'ensemble des textes écrits" [the only source recognized as valid by professional historians, the collection of written texts], and Jan Vansina who in the same journal states, "'Written sources are better than oral ones.' This is the maxim of a non-historian.... There is nothing intrinsically less valuable in an oral source than in a written one."¹ It should be noted that Cornevin is in fact arguing for the use of oral sources, but he conceives of them as not admissible according to the canons of historical methodology. If we turn to the standard treatises of historical procedure, the case seems to be settled conclusively in Vansina's favor. Thus Eduard Bernheim in his classical Lehrbuch der historischen Methode (1889) considers any source legitimate from which we can infer past events and discusses

a variety of methods, including linguistic methods, besides the use of written documents. Moreover, he states that in principle all peoples are historical and the principles of historic investigation are everywhere the same.

But while this is so, in Africa the historian is confronted with the challenge on a massive scale to make use of a variety of sources besides the written documents which, in practice, have furnished the basis for historical research.

Among other types of evidence the potentialities of linguistic data are as yet in the initial stages of exploitation. Although some historians are barely aware of the existence of this source of historical inferences and others are skeptical because of its misuse in the past, it is not overstating the case to say that language is capable of furnishing significant independent evidence regarding many important aspects of Africa's past. The independence of linguistic from other types of evidence should be stressed. For a fundamental principle of historical reconstruction is that the same event may leave multiple traces each of which provides independent evidence for the same fact.

If, for example, one people borrows the cultivation of a particular food plant from another, it will have taken over the genetic varieties known to the donor and similar methods of cultivation and possibly have borrowed the word for the plant itself and some terminology referring to its cultivation. Each of these traces belongs, as it were, to a different system. Thus the variety cultivated is significant when compared to the distribution of related plants within the theoretical framework of genetics. Similarly, the linguistic terminology is part of a language and must be evaluated both by evidence from other aspects of this same linguistic structure and by comparison with related or borrowed terms in other languages. Linguistic evidence is thus but one of a number of kinds of independent evidence, and the linguistic method will normally be a tool to be used in conjunction with other methods. Moreover, like all methods of historical inference, it gives merely probable results and the degree

of probability varies in individual instances, though it may on occasion be very great.

It is, of course, not possible to explain here the considerable variety of methods available for the historical interpretation of linguistic data. The classic paper of the anthropological linguist, Edward Sapir, Time Perspectives in Aboriginal Culture (1914), still provides a readable and sound theoretic introduction to the subject, though it obviously requires some supplementation in the light of present-day knowledge. I should like, however, to illustrate but one of these methods, one, in fact, which is of minor significance in the total linguistic arsenal.

While on a recent plane trip, I happened to glance at those bags which airlines have discreetly placed within reach of passengers in case of distress. On one side of the bag was the English inscription "For airsickness"; on the other, in Spanish, Por mareo aéreo, etymologically to be paraphrased as "seasickness of the air." Mareo is of course derived from the Spanish word mar, "sea," and means in isolation "seasickness." In the period before air travel when this was the primary form of motion sickness, mareo would mean both motion sickness in general and seasickness in particular, but now it is qualified by an adjective meaning "aerial" to mean "airsickness." This usage can be explained only on the assumption that sea travel preceded air travel chronologically.

This is an example of a general principle that whenever a phenomenon is described by a complex term, e.g., "airsickness," mareo aéreo, which contains as one of its parts a related phenomenon e.g., mareo, "seasickness," it is the phenomenon designated by the complex term that is the more recent. The example is, of course, trivial because in this instance we have so much other evidence, but some African applications will show that the results are not necessarily trivial when other sources are lacking. Thus, in Hausa k'arfe by itself means "iron" or "metal" in general, while copper is designated by the complex term jan k'arfe, "red metal" or "red iron." The case is exactly parallel methodologically to the Spanish example, and the conclusion is that copper was more recently known to the Hausa than

"iron." Again, in the same language dawa means sorghum or Guinea corn but "maize" is described by a compound, dawar Masara, meaning "Guinea corn of Egypt." Here is additional information beyond the relative recency of maize as against sorghum cultivation, namely, its provenience from the Moslem north, a historic fact of wide bearings into which I cannot go further at this moment.

One other aspect of linguistic evidence is worth stressing. Along with other nondocumentary evidence, it is not to be conceived as a mere stopgap or pis aller where documentary evidence is lacking. The latter has no privileged position but has its strengths and weaknesses just as other types of evidence. It tends to be more circumstantial and not necessarily to be more reliable. As contrasted with archaeological or linguistic evidence, it is subject to conscious or unconscious distortion in accordance with the biases and the perspectives of the writer or may itself merely enshrine earlier oral tradition. Linguistic evidence has a relatively objective character. Thus whether they wish it to be so or not or whether they even know it, the Finns have preserved in their language evidence of cultural contact in the form of words borrowed from early Germanic, and this evidence is as objective and reliable as that furnished by archaeology in similar cases.

Thus, I believe that the linguistic evidence, which in this case agreed with an oral tradition tinged with mythological elements, was sufficient to show that the Hausa were first Islamicized by their eastern neighbors the Kanuri. In this instance, linguistics and oral tradition give more reliable information than an eminently respectable written source, the Kano Chronicle.

In the area just discussed, the path is well marked and progress is a matter of time—although probably a considerable period of time, since much of the advance here is contingent upon the application of the well-tested methods of reconstructional linguistics to language families which are of vast extent and on which, with the exception of Bantu, comparative work has hardly begun.

In contrast, sociolinguistics as a distinct field of inquiry

is of very recent vintage although, as is usual in such cases, much relevant work has already been carried out under differing auspices. The recent development, however, under the specific name of sociolinguistics has been the work almost exclusively of linguists and has arisen largely out of problems encountered in the developing areas. It has obvious points of contact with other disciplines, notably anthropology, sociology, political science, social psychology, and education. It was in recognition of the relevance of sociolinguistics for sciences other than linguistics proper that the Social Science Research Council organized a committee on sociolinguistics in 1963 and sponsored a summer-long interdisciplinary seminar on the subject at the Linguistic Institute held at Indiana University in the summer of 1964.

That language has a basic social dimension is, of course, far from a novel notion to linguists. At the very beginning of linguistic research, the object of the linguist's study is given in the form of a large number of distinct entities commonly called languages. It has long been realized, however, that what are usually considered languages by both the linguist and the nonlinguist are not definable on purely linguistic grounds but require reference to other human social institutions. Thus, to cite a stock example, the dialects of northern Germany so-called Low German, are linguistically closer to Dutch than to High German but are considered dialects of German rather than Dutch for political reasons. The linguist seeks to abstract from the nonlinguistic aspects of the situation by resorting to mutual intelligibility as the criterion for deciding whether two people speak the same language. This turns out to be difficult of application and to involve various individual and social psychological factors. Moreover, there are cases where two dialects A and B are mutually intelligible and B and C are mutually intelligible but A and C are not. There have even been instances reported in the literature of nonmutual intelligibility where A understands B and B does not understand A. For these reasons such an apparently simple question, often put to linguists, as how many languages are spoken in Africa is not susceptible of a clear-cut answer and succeeds only in producing annoyance in the linguist who may, under the circumstances, produce an extended discourse on the difficulty of the question. On the other hand, he may, perhaps more wisely, announce some definite number, for example 863, and

so send the questioner away happier though presumably not really wiser than before.

The answer is easier in Europe, or appears to be so, because a historical process, known as language standardization, has already taken place over a long period of time and usually without the intervention of professional linguists. In Africa such is normally not the situation and the linguist is likely to be called on to assist in the choice of some particular dialect as the basis for standardization. By this is meant roughly the production of an orthography and the modification of grammar and lexicon and possibly the planned extension of the last to communication for scientific and other purposes for which it has not previously been used. In so doing he finds that the choosing of the dialect in the first place and the carrying out of standardization are kinds of social engineering requiring, for example, careful attention to existing attitudes of dialect groups towards each other and connotations of orthographic choices which depend on the previously existing orthographies. Few matters seem to arouse as much emotion as changes in orthography. Thus the linguist Archibald Tucker was the target of threatening demonstrations when he tried to change the manner of writing long vowels in a particular East African language.

After these preliminary remarks, which are intended merely to give some notion of the flavor and range of the questions which have been considered sociolinguistic, I will attempt to give a more systematic review of the scope of the field by considering four main areas of investigation. The first of these deals with the distribution of the varieties of speech with regard to some given population. As so stated the problem is descriptive and static, but its further study leads to attempts to observe and understand the dynamic processes at work. In essence the study of such language distribution is a censuslike demographic task though one which in its more complex aspects is well beyond the scope of ordinary census methods and as yet is hardly attempted even in countries with advanced technologies. By language variation we mean here not only gross language differences such, e.g., the distinction between French and Basque in France, but also the specification of distinct varieties whose very existence has to be ascertained in many cases, e.g., regional, class, and

occupational varieties. Moreover, we need to know much more regarding the extent of multilingualism and, where it exists, the relative competence of speakers in the different languages as well as the situational determinants of their use. Obviously much of this can be done only on a sampling basis, for on a mass basis it is probably pointless and in addition may exceed the human and financial resources that can be devoted to it by official census organizations.

It is of interest to note that the recent census of India marks a real advance in its linguistic aspects. Not only is multilingualism taken into account, as has been done in the past, in Mexico, for example, but it is cross-tabulated against religion, caste, and local region and produces fascinating results which one would think of great interest for all social scientists concerned with India.

Linguists have already proceeded to the construction of typologies of national states on the basis of language distribution, e.g., nations with a single standard language spoken by all or almost all the population at one extreme and multilingual states without any predominant local language at the other. Again, there have been moves in the direction of conceptualizing the varying social functions of language within a local community or larger political entity and investigating the factual situations which exist in regard to the languages used in these functions. Examples of such functions are use in higher education, elementary education, law courts, broadcasting, the home, etc. Such data have usually been gathered rather impressionistically and with little regard for sampling procedures. The collaboration of other social scientists is therefore of obvious value in rendering such observations more accurate and critical. One aspect of this general problem should be of particular interest to sociologists interested in social stratification. That class and status differences are reflected in, and indeed are partially marked by, language difference is well known, and sociologists who have occupied themselves with the class structure of communities in the United States, for example, have mentioned this in passing. However, serious work has hardly begun in the direction of actually specifying such differences in linguistic terms, studying their distribution in relation to other criteria, and investigating their operation over time in reference to class mobility.

In Africa the spread of lingua francas or auxiliary languages is obviously a social process of great significance concerning which little is known. Again, the degree and types of multilingualism in relation to the maintenance of tribal cohesion, particularly in the complex urban situation, provide a rich and hardly tapped area for investigation.

A second area of sociolinguistics is essentially social-psychological. Even if we knew all the demographic facts about multilingualism and the linguistic facts about the extent and type of command of each language by speakers, a highly significant factor would be omitted if we did not inquire into the attitudes of speakers regarding the languages they speak. It seems safe to say that no man can employ two languages without having differing attitudes towards and images of each. Like the servant in Matthew with two masters, "he will hate the one and love the other, or he will be devoted to the one and despise the other." A very common situation is summed up by linguists in the dichotomy mother tongue/ other tongue. The topic may obviously be approached by the social psychologists in terms of such techniques as attitude scales, semantic differentials, and various projective tests. A disregard of these factors is often shown in the rationalist approach to language as a purely practical method of communication so that the view is sometimes expressed that the spread of auxiliary languages will lead to a great simplification of the linguistic picture in such areas as Africa. What this omits is precisely the factor of attitudes and values towards language in which, as a general rule, the lingua franca is the "other tongue" and the emotional attitude towards it cold or negative.

Thus far the question of attitudes towards language has been treated as one of individual psychology, but such an approach, taken alone, is one-sided and inadequate. There are crystallized group values towards language which carry over at times into the political sphere. This brings us to the third main area of sociolinguistics, the study of language as a source of group identification. In Africa language is clearly fundamental since the tribe, still the social grouping to which the vast majority of Africans give their primary allegiance, is defined mainly on linguistic lines. A linguistic map

of Africa will hardly differ from a tribal map. For this reason, if the end of tribalism in Africa is devoutly to be wished, as many feel—although there are indeed extralinguistic factors in industrialization which may temper tribalism—its extinction without the concomitant extinction of multilingualism is unthinkable.

It is clear, moreover, that language not only furnishes a primary basis for ethnicity but itself becomes a political issue. In the United States, very nearly a monolingual country, we are almost free of such issues, but in countries such as Belgium and India language is at the very center of the political stage.

And we come to the fourth and final aspect of sociolinguistics an aspect which is in the broadest sense political, namely, language as an area of decision making. It is most obvious on the governmental level where a choice must be made of one or more official languages, or where the employment of languages at different levels of the educational process must be made by ministries of education, or where in multilingual situations there are demands for the recognition and sponsorship of languages for various purposes, chiefly educational. The last situation may develop to the point it has reached in India where the demand is made for the drawing of provincial boundaries along linguistic lines.

Decisions like these require certain data of a sociolinguistic nature, such as the basic facts regarding the distribution of the languages—facts which are often not sufficiently known. At times a more purely linguistic expertise is required in decision making. Thus, the proposal has been made for South Africa that a common Bantu language be devised which would be satisfactory for educational purposes and general communication between the two main groups of Bantu speakers, the Nguni and the Sotho-Chwana. It is an exclusively linguistic judgment that these two groups are too different from each other to make such a plan feasible.

Where decisions are made regarding the standardization of certain languages and their employment for certain purposes, the problems of language engineering proper, as mentioned earlier, are

involved, and cooperation between linguists and other social scientists is clearly required.

In general, the linguistic communication situation, as it might be called, is an overall factor in economic development. In spite of its pervasiveness, this factor may easily be overlooked by those who are interested in economic development but have an American monolingual background. For example, Gumperz, a linguist, found that directives issued in standard Hindi could not be understood on the village level even in a theoretically Hindi-speaking area, both because the dialect underlying standard Hindi was so different and because new terminology of a technical nature had been introduced into it but knowledge of this terminology had not penetrated the villages.

Perhaps some notion of the importance of this factor may be gathered from the following projection of Nigerian facts on the United States. If the Nigerian linguistic situation were transferred to the United States on an approximate scale, the country would have at least 500 languages. At every stop for gas on a cross-country trip we would encounter a different local language, and even our auxiliary language, which might be useful enough for practical purposes, would change with every day's travel.

In regard to cooperation between linguists and psychologists, I believe the most fruitful area of cooperation is in the expanding field of psycholinguistics. Here what was said about the vagueness of definition and the relatively new and unexplored character of sociolinguistics applies in even greater measure. It is advisable at the moment, therefore, not to attempt to define the subject matter in terms of definite topics.

As justly pointed out by Leonard Doob in his chapter on psychology in The African World: A Survey of Social Research (1965, p. 374), "much of the psychological research in Africa can be shown to involve a recurrent question: in what ways and for what reason are Africans different from other ethnic groups?" In carrying out such research, verbal material is almost always involved and the experimental method is the dominant one and probably will

continue to be so. In fact, the clinical method, or the older method of introspection, were it ever to be revived, would cause even greater difficulties in regard to language.

The model in demonstrating the presence or absence of group differences according to the experimental method employing verbal material is, ideally, to discover whether the responses evoked by identical stimuli are significantly different in different groups. But if the stimuli themselves are different, as they will generally be if they are in different languages, then the research designed is flawed by the presence of another variable—whether the translation furnishes an equivalent stimulus.

But language need not be just a barrier; it may also be an opportunity. In psycholinguistic research, language itself is one of the fundamental variables. Hence to vary it is in keeping with our basic aim in research. And here the necessity of extending experimentation on verbal behavior beyond the few Western languages which have constituted, up to now, nearly the only languages employed in the experiments is crucial. This would be an application to psycholinguistics of Doob's statement that "Africa, like any other place outside the West, provides a different cultural setting and hence different people for testing the universality of psychological theory."

The following example may serve to illustrate what is meant. In experiments on word association—where, to a given stimulus word determined by the experimenter, the first response word is recorded—it is found that the most frequent class of response to the stimulus of a particular part of speech is one and the same as that of the stimulus. For example, the most frequent response to the word "day," which is a noun, is "night," which is also a noun. This holds for all parts of speech, but there is a significant disparity between nominals (in which class I put together nouns and pronouns) and verbs. Thus in a study on the subject by Jones and Fillenbaum nominals produced other nominals as responses approximately 80 per cent of the time, whereas verbs produced verbs only 43 percent of the time. Similarly verbs produced nominal responses 18 percent of the time and nouns produced verbs only 3 percent of the time. Does this mean that in some sense nominals are psychologically more central

or prominent than verbs? Before answering this affirmatively one must consider another factor, namely, the likelihood that a word will tend to produce a word which frequently follows immediately, a so-called syntagmatic response. Since in English the normal word order puts the object after the verb, it enhances on this hypothesis the probability that a verb is followed by a noun as against a noun being followed by a verb. The actual nature of the associates found in cases of verb (stimulus)/ noun (response) seems to indicate that this is a factor, e.g., "meat" as a common response to "eat," but whether it can account for it entirely is another matter. If we found a language in which the nominal object preceded the verb, we could then take into account the factor of word order as a variable to see if in such a language the verb still elicited nominal responses to a significantly greater extent than nouns elicited verbs.

We could use Kanuri or Nubian in Africa, but we could as easily use Turkish or many other languages. The argument here is not that we have greater need of extending research into the psychological correlates of linguistic structure in Africa than elsewhere but that there is a need for manipulating linguistic structural variables going outside the almost exclusive framework of American college phonemes.

Another important area in which linguistic research involves other disciplines is the study of oral literature. Nowhere, perhaps, does a profound cleavage between social scientific and humanistic viewpoints appear more clearly than in the contrast between the approach of the linguist and that of the student of literature. This has partly expressed itself in the interest of the linguist in spoken language as his primary field of study as contrasted with the concentration of the literary student's attention on written texts. In such areas as Africa where so much of the literature is oral, one might hope that the conflict would be resolved, for the analysis of aesthetic aspects of style is least separable from linguistic analysis under these conditions. It would be edifying indeed to be able to say that the literary lion would here lie down with the linguistic lamb; or, according to one's point of view, that the linguistic lion would lie down with the literary lamb and that oral tradition would lead them.

However, this would require that there be a far more widespread appreciation of differing literary values on the part of students of literature than now exists. There have been many encouraging indications, but a long road still lies ahead. What might be called the universalization of taste has largely taken place already in the graphic and plastic arts and in music. But in literature, understandably enough, the trend has been far slower because preliminary to the difficult task of the discovery and appreciation of alien literary values are the study and understanding of the language which is its instrument. Of what avail to invite me to appreciate the style of Mafolo's *Chaka* in the original Sechwana if I have not first mastered the intricate structure of the Sechwana language?

In all this, using the better part of valor, I have considered what should be done rather than who should do it. But clearly there is a difficulty here. It is precisely because they do not fit easily into the established framework of disciplinary research that the fields already mentioned have been relatively neglected.

Moreover, there is no single, overall solution to the problem of research and graduate training raised by the heterogeneous group of problems to which the name interdisciplinary is commonly applied.

A first step would seem to be to develop a typology of such fields with reference to their relation in subject matter, techniques, and basic orientation of the established disciplines. I will present here, in closing, merely a few considerations based on the specific fields mentioned earlier with the hope that they might aid in such an analysis. Thus the problem of the use of linguistic evidence in reconstructing culture history may be regarded as belonging to an unhappy subtype in which one discipline, in this case history, is interested in the question but does not have the techniques to give the answer and another, linguistics, has the technique but is not interested in the question. At least *qua* linguist this will be so, though some particular linguists might have genuine historical interests likewise. I would therefore suggest that this is a field for historians and that graduate students in history should

receive training in the use of linguistic evidence for historical purposes. I do not believe that the solution here is for history graduate students to take a few general courses in linguistics. If they do, they will learn much that is irrelevant to their task and miss much that is of potential value. I believe that we need special courses in this matter designed expressly for historians and probably to be taught in history departments. Although at present such a suggestion might seem both impractical and wasteful, with an increase in the number of professional scholars there will be a growing demand for training in aspects of the established disciplines which today are sparsely represented.

Another subtype is represented by psycholinguistics. Here I believe that the questions to be answered have relevance to both psychology and linguistics as presently constituted. It is merely that they have to be, for the majority of practitioners in both disciplines, introduced to each other, as it were. Psychologists, by and large, are not acquainted with linguistics and therefore are unaware of the specific ways in which language provides testable hypotheses about human behavior. Linguists, in their traditional isolationism, often are unaware that the unifying theory from which they might deduce the regularities of human linguistic behavior is, in large part, psychological. This seems to be an area in which students in one discipline would benefit from an overall view of the problems and results of the other discipline and collaborative research could be fruitful.

What has been said here from the viewpoint of the linguist is necessarily been incomplete, in that only a few fields were mentioned and each was considered only in very limited aspects. Those representing still other disciplines could doubtless have presented a roster of problems of interdisciplinary concern with a different set of details. But all would, I believe, tend to the same general conclusion—that African studies, like other areal pursuits, have contributed and will contribute even more in the future towards stimulating interest in a wide variety of significant and relatively neglected problems.

NOTES

This is Professor Greenberg's presidential address presented at the African Studies Association Annual Meeting on October 29, 1965.

¹ Cornevin, Journal of African History, II (1961), 20;
Vansina, *ibid.*, I (1960), 52.

In Collaboration with Jack Berry

Sociolinguistics is a recently developed subject of interdisciplinary study in the social sciences. Joseph H. Greenberg has indicated the scope of this field and its relevance to African studies in general in his contribution to Robert A. Lystad's The African World: A Survey of Social Research (New York, Praeger, 1965; p. 427). He includes in sociolinguistics such topics as "the relation of language differences to social class; the differential social roles of different languages co-existing in the same society; the development and spread of lingua francas as auxiliary languages in multilingual situations; the factors involved in the differential prestige ratings of languages; the role of language as a sign of ethnic identification; language in relation to nationalism; and problems of language policy, e.g., in education." Africa, with its emerging nations, is an ideal area for such research, since the development of new nations entails problems which sociolinguistic studies are particularly fit to solve. Much of the linguistic work done in the colonial era and even in more recent years is inadequate, because of lack of reference to the relevant social context. With regard to this situation, the Committee on Sociolinguistic Research in Africa of the ARC considered it advisable to include in the January conference some topics which are usually handled under the headings of ethnolinguistics and psycholinguistics, e.g., the changes induced in one language by contact with another in the context of the general culture-contact situation, including its nonlinguistic aspects, and the problems of attitudes and behavior toward language.

In surveying the field as a whole, this committee came to the conclusion that, for its immediate purposes, three subgroups of studies could be distinguished, and its discussions were accordingly conducted on the following topics:

1. Description of habitual language usage.
2. Behavior toward language.
3. Dynamic study of social and psychological variables.

As regards language usage, linguistic research in sub-Saharan Africa has traditionally concentrated on the description of the linguistic situation of Negro-African languages. The majority of these descriptions has been characterized by anthropological "purism" in that the selection of typical rural varieties of indigenous languages has been the rule.

It is our hope that future linguistic research in Africa will broaden its scope to include other kinds of linguistic phenomena which occupy a central place in communication in modern Africa. While not neglecting the more traditional rural varieties of Negro-African languages, a broader perspective should take full account of the newer urban varieties of indigenous languages which are developing in many African cities, e. g., the Wolof of Dakar, the Susu of Conakry, and town Bemba in the Zambian Copperbelt. More attention should also be paid to the nature and spread of languages such as *linguae francae*, whether indigenous or of European origin, whether pidginized or not. Typical examples of these are the up-country Swahili of Kenya, Uganda, Tanganyika, the Congo, etc.; Hausa in the countries of the sub-Saharan borderland; Sango in Central Africa; varieties of pidgin English in Liberia, Nigeria, Ghana, and the Cameroons; Kimbundu in Angola and even in Mozambique; etc.

Lastly, research into the nature of purely African varieties of standard languages of foreign origin is long overdue and has much practical relevance. This would include the regional standard forms of French, English, and Portuguese in West Africa and their relations to the standard forms of these languages in their home countries. To the same category would seem to belong comparisons of Afrikaans and Dutch. By "regional standard English," etc., we refer to the forms of these languages as actually spoken and written by educated

Africans. Although it is often assumed, both in Africa and in Europe, that "correct" English, French, and Portuguese as used in Africa are or ought to be identical to European usage, there is ample reason to question this assumption. What is needed at this time is more detailed knowledge regarding the similarities and differences between African and European standard English, French, and Portuguese. Only when set in the context of such knowledge will practical and aesthetic programs of language normalization and change be effective.

With this larger scope in view, descriptive projects could include:

a) Country-by-country surveys, giving a detailed profile of the national language situation according to the various approaches described in the literature.¹

b) Dialect surveys of specific indigenous languages. As an example of a language area in which an obviously urgent need exists for such a study we may point to Ibo. Where, as in the Yoruba area, adequately trained local linguists are equipped to perform the task, dialect surveys should not be restricted to a limited set of loglosses chosen for their relevance to historical studies but should supply wide information on the various levels of linguistic analysis. This, of course, is assumed that these studies may take the form of detailed monographs, or of more general works like dialect atlases.

c) Controlled comparisons of defined African languages, like Wolof, Swahili, or Hausa, which are used side by side, both with English and with French as languages of wider communication, in order to measure the varying impacts of the superposed European language and culture. In this line of research, more specific attention should be given to recent developments in widely used African languages in the local press and other means of mass communication with reference to the coexisting European language.

Under the heading of behavior toward language, two related but quite distinct topics are subsumed.

a) Language policy, i.e., the action of the agency planning language development and standardization, be it the government, a local language board, or the missions. A careful study of the historical background is required in this matter with regard to the language policies of the colonial powers (1) on the highest level, as a reflex of the governmental formulation of the colonial policy, whether it strives toward assimilation or toward association; (2) on the middle level, e.g., by language conferences when conclusions are implemented by the colonial authorities (e.g., the Redjaf conference in the Sudan); (3) on the lower level, namely, in the actual local implementation of decisions taken higher up. The policies of the colonial powers, which pursue deliberately practical purposes, will be contrasted with the policies of the independent states, which may use language as an instrument of national unity. Important also in this respect is an assessment of the African reaction to these various policies, especially the present position taken by African political parties in the matter.

b) Attitudes toward language, i.e., examination of the discrepancies between what people say and what they actually do in current language usage, as revealed by control of census and questionnaire responses. A method should be set up by psychologists to define the kind of stereotypes people entertain with reference to language, e.g., judgments of value on the basis of potency, aesthetic evaluation, and assumed usefulness. It is important to examine not only stereotypes of the language or languages actually used by the informants but also stereotypes of other local languages of which they do not have the same command and to see how these judgments correlate with their general attitude toward the relevant culture. These stereotypes will have to be kept in mind in any evaluation of the sociolinguistic situation, since they materially affect questions about mutual intelligibility as well as attitudes, not only towards the teaching of the relevant languages but also on the family level.

Under the third rubric we subsume studies which attempt to account for language situations in terms of the dynamic interaction of social and psychological variables. Such studies are in essence

contrastive in the sense that the same speech community is studied at two or more points in time or, alternatively, different samples drawn from the same speech community are studied at roughly the same time. If contextual analysis of the linguistic repertoires elicited or observed on these occasions reveals them to be different, it may then be of interest to the investigator to determine the sociocultural processes that account for the repertoire changes or differences noted.² In this sense, dynamic sociolinguistics (as opposed to its purely descriptive endeavors) is closely related to the study of sociocultural change more generally.

One of the major sociocultural phenomena of postwar Africa is the complex process of nation formation and the accompanying processes of adopting the nation as a meaningful reference group in individual and group behavior. Peoples who hitherto had little but a foreign master in common have suddenly themselves become masters of political entities. Africa may well be of particular interest to those sociolinguists who are concerned with the consequences for linguistic repertoires of nationhood, a topic certain of whose aspects are much more difficult to fathom in most American or European settings.

Every new African state contains speech communities for whom the nation is not yet a significant factor in behavior. Tribal groups exist whose members define themselves in the same terms as did their ancestors—in terms of the primordial givens of kinship, territory, and custom.³ Under these circumstances of society on a relatively small scale, language may or may not be recognized as an essential aspect of groupness. In such societies, sociolinguists must seek to discover if different registers (socially defined variants) or languages are in use and, if so, the relationship and situations with which they are associated.⁴

On the other hand, there are also other populations in all African countries who have adopted the nation as a very central reference group. Much of their behavior is ideologically mediated via such symbols as national history, national mission, national future,

and national language. Their linguistic repertoires are bound to be very different from those of their tribal cousins. If indigenous languages alone are involved, one of them is likely to be viewed as special in terms of its national unifying role. It is likely to be richer in registers and far richer lexically than the others. If a European language is assigned a national role, then indigenous languages may come to be utilized in ever more restricted or marginal domains.

Sociolinguistic research in Africa must seek to determine the stages and processes whereby African populations change from tribal to national guides of behavior, in language as in dress, in governmental and legal codes, in recreation, in aspirations, in religion, etc.

One of the factors facilitating social change—including change in linguistic repertoires—is migration. Nationhood often results in increased population movements (although such movements have long been traditional in various parts of Africa and although extensive migrations took place during colonial days) as a consequence of national industrial and agricultural policies. Migration from one rural setting to another may upset traditional linguistic repertoires only if new culture contacts are realized thereby. Migration from rural to urban settings is usually a far stronger stimulus to repertoire change, for it frequently involves basic occupational changes and, therefore, far-going changes in traditional modes of relating to others within and without the primary family group. This is all the more true if migration is to relatively new industrial centers in which almost no one has traditional roots.

In such centers the institutions of nationhood may be particularly deserving of study: the school, the press, the radio, the factory, the social welfare agency, the police. These are the symbols of nationhood, and these are also the shapers of language per se and of radically different linguistic repertoires in terms of the registers and languages employed.⁵ In addition, the very operation of these institutions is linguistically encumbered so that it is pertinent to ask not only how they influence language but also how the language situation (multilingualism, lexical insufficiency, lack of literacy, etc.) influences them.

In contrasting rural and urban populations and migrants and nonmigrants along the paths to nationism, sociolinguistic attention should be directed to the possibility of differential impact on men's and women's speech, on the repertoires of the literate and the illiterate, on the repertoires of the old and the young. Repertoire differences that once existed may vanish, and entirely new ones may arise.

Between the old extreme of primordial tribalism and the new extreme of modern, nation-oriented life, there may be a more or less prolonged intermediate stage of ideologized tribalisms grafted into an urban locale. In this stage tribalism becomes a rallying cry in the quest for jobs, housing, schooling, etc. Instead of being expressed as formerly, via the traditional practices of the daily rounds of life, it is expressed via instrumental organizations (tribal clubs, tribal unions, tribal political parties, tribal newspapers, etc.). Ideologized, transmuted tribalism is obviously different from supra-tribal nationism in many ways. Sociolinguistic research in Africa must ask whether these differences are also recognizable in the linguistic repertoire.

Other way stations on the paths to nationism may be a shift in tribal identity or a shift from tribal to regional self-identification. In these instances, as in those mentioned above, it is most pertinent to ask whether language shift occurs more rapidly when it precedes or when it follows a reference group shift. Some Tera speakers may use Hausa for instrumental purposes without first coming to think of themselves as Hausas. Others may shift to Hausa as part of a broader process of ideological-cultural assimilation, similar to that of the emulative Sanskritization of lower castes in India. Under which circumstances is one pattern of sociolinguistic change more prevalent than the other? Which is more reversible? Can a strictly tribal language become the bearer of nationism (i. e., of supra-tribalism), or must a supratribal language (at least a regional lingua franca) be available for this purpose? Will the abandonment of native languages actually help rather than hinder the preservation of bilingualism and diglossia in Africa? These are a few examples of the sociolinguistics questions with which the study of sociocultural change in Africa must grapple.

As a concrete illustration of the rich possibilities offered by one particular type of sociolinguistic study, namely, the investigation of a single widespread language spoken in widely differing social and political milieus, we consider here the kinds of research that might be undertaken in the specific instance of Swahili. From this it will appear that a research project on sociolinguistics in the Swahili-speaking area of East and Central Africa would adequately cover the various aspects of the field as defined in this document. A study of the spread of Swahili would carefully determine, for each area, its position versus the locally spoken languages and the extent of its use as lingua franca, examining in particular those minorities for which it is actually the first language and inquiring into the historical background of that situation. The same project would also involve a detailed dialectal survey of Swahili itself, contrasting the indigenous coastal varieties with the secondarily developed up-country varieties, whose relation to the first language of their speakers would be closely scrutinized to establish the degree of mutual linguistic interference. The dialectal inquiry would be conducted sociologically as well as geographically: any contrast in usage between generations would be pointed out in order to determine what criteria denote change; the influences of the school and of the modern media of mass communication (press, radio, etc.) would be thoroughly analyzed; special attention would be given to social levels and types of relationship in which Swahili is preferred to the locally used European language. Pilot inquiries in representative communities both rural and urban, would indicate for what purposes Swahili is the usual language, and what kind of Swahili is used in:

- a) Education (e.g., at which levels and to what extent is it the language of the curriculum?).
- b) Administration (e.g., what kind of official documents are issued in Swahili? To what extent is Swahili used for internal oral communication in the offices as well as for outside contacts with the public?).
- c) Police (e.g., in Uganda, where it is used as the usual contact language for the police force in towns, though it is otherwise officially ousted from public life).

- d) Missions (e.g. . for preaching and evangelization, in particular through religious literature).
- e) Intertribal relations (e.g. , which language prevails in case of intertribal marriage and what are the consequences for the education of the children ?).
- f) Interracial relations (especially with Asians and Europeans).
- g) Contacts with the outside world (e.g. . press, radio, and television).

Literary forms of the language would also have to be examined and contrasted with spoken forms; in this respect a special study of the extent of the impact of Bantu and non-Bantu neighboring languages, as well as of English, French, Portuguese, and even Italian (in Somalia), would be required; word geographical studies might be particularly relevant to this type of inquiry.

Moreover, in the various areas, special attention should be given to the local policy towards the language particularly with regard to the scope and effectiveness of official interference, as well as to the attitude of the speakers of Swahili as first or second language towards the governmental policy and towards the use of Swahili versus local languages and versus European languages. An evaluation of the results of the action of the Tanzanian government to make Swahili a decisive factor in nation building would have to be given, with due consideration of the historical background of this policy. Because of their general value, many conclusions derived from such a detailed study would be useful for the further development of sociolinguistic research in Africa.

In concluding its report the committee makes the following specific recommendations:

1. In view of the fact that even now for many parts of Africa the most fundamental linguistic-demographic information is unknown or not available in forms easily accessible to scholars, it welcomes

the updating and expansion of regional coverage by volumes of the type already appearing in the Handbook of African Languages series of the International African Institute. It also considers that the compilation of linguistic handbooks with fundamental information by countries would be a highly useful endeavor in the present state of the field.

2. It urges that African linguists take the nearly unique opportunities afforded by the linguistic sessions of the African Studies Association annual meetings to develop programs of wider appeal to nonlinguistic specialists and to stimulate their interest in sociolinguistic as well as other linguistic topics of interdisciplinary importance (e.g., linguistic approaches to culture-historical problems). It suggests that the Languages and Linguistics Committee of the ASA take whatever action is appropriate to this end.

3. While it does not believe that a separate administrative organ for stimulation of sociolinguistic studies in Africa is necessary, it calls the attention of the African Research Committee to the activities of the Languages and Linguistics Committee of the African Studies Association, of the Committee on Sociolinguistics of the Social Science Research Council, and of the African Languages Committee of the Center for Applied Linguistics as the organs presently existing and among which possibilities of liaison and cooperative activities exist.

NOTES

This is the report of the conference sponsored by the African Research Committee and held January 27-28, 1966, at the Center for Advanced Study in the Behavioral Sciences, Palo Alto, California. Jack Berry and Joseph H. Greenberg were the co-chairmen of the conference.

¹For example, C. A. Ferguson, "The Language Factor in National Development," in Frank A. Rice, ed., Study of the Role of Second Languages in Asia, Africa, and Latin America (Washington,

1962), pp. 8-14; W. A. Stewart, "An Outline of Linguistic Typology for Describing Multilingualism," ibid., pp. 15-25; Joshua A. Fishman, "Varieties of Ethnicity and Varieties of Language Consciousness," in Georgetown University Monograph No. 18, Languages and Linguistics (Washington, 1965), pp. 69-79; Heinz Kloss, Die Entwicklung neuer germanischer Kultursprachen von 1800 bis 1950 (Munich, 1952).

²By repertoire we mean the languages and language varieties employed by speakers and their situational distribution. For further details concerning this concept see John J. Gumperz, "Linguistic and Social Interaction in Two Communities," American Anthropologist, LXVI, No. 6, Part 2 (December 1964), 137-153.

³The term "tribe" is no more a simple phenomenon for definitional purposes than is the term "dialect." Both may be defined in terms of certain external criteria that vary along a contrastive developmental progression (tribe to nation, dialect to language), or they may be defined from within, in a folk taxonomic sense. Both of these progressions are discussed in John J. Gumperz, "Types of Linguistic Communities," Anthropological Linguistics, IV, No. 1 (January 1962), 28-36, and in Fishman, "Varieties of Ethnicity and Varieties of Language Consciousness," pp. 69-79.

⁴"Register" is here used to designate a socially differentiated variety of language as distinct from a more basically regional variety or "dialect." Dialects, too, may come to be registers (and, indeed, most dialects are) as their speakers are reacted to not only as regionally different but as refined or uncouth, learned or ignorant, affluent or impoverished on the basis of their speech.

⁵Of similar importance are such (probably temporary) withdrawals from the pursuit of life on a larger social scale as nativism. Do revitalization movements inevitably lead to the glorification of classical linguistic repertoires, or is a full-fledged return to linguistic origins as impossible as it is in connection with other aspects of the original sociocultural fabric?

Of the myriad species that inhabit the earth, man is unique in the complexity of his institutions and the extent of his mastery of the inanimate and animate environments. Anthropologists and other social scientists agree that this is due to a uniquely human mode of adaptation, the cultural. Man has grown taller than the giraffe and tunneled more deeply in the earth than the mole, not by evolving a longer neck or a more efficient snout, either of which would probably take him many thousands of years, but through an accumulation of knowledge and skills. Moreover, each new human being does not have to face his environment on the basis of his individual equipment and experience. He grows up in the midst of one or another of a large number of human groups, through which he acquires knowledge, technological skills, modes of interpersonal adjustment, values, beliefs, and much else with which he confronts the world. This accumulation constitutes the nonbiological inheritance that we call the culture of the particular group.

Among all the aspects of the cultural inheritance, anthropologists are virtually unanimous in pointing to two, tools and speech, as the most fundamental, in that they provide the indispensable prerequisites for the remainder.

With regard to tools, a certain clarification is necessary. We are talking here of toolmaking, not tool use. Man's closest biological relative, the anthropoid ape, in this respect as in others, closely foreshadows human development. Anthropoid apes as well as certain other primates, notably baboons, use as tools objects that are already found in the environment, such as sticks or stones. Only man makes tools, however, in the sense that he modifies objects that he finds so

as to produce new artificial objects that are adapted to some specific end. A seemingly marginal case is Köhler's chimpanzee Sultan, who in a famous experiment fitted together two sticks with which he then knocked down a banana that he could not otherwise reach. While Sultan did produce an object that he did not find in his environment, the sticks had previously been fashioned by human carpenters to fit together. Without the prodding of the human experimenter, even Sultan would not have selected two sticks of his own accord and then put them together to form the tool he needed. At least, no nonhuman species has ever been observed to behave in this or in any comparable fashion on its own.

The two basic human traits of toolmaking and speech are more similar to each other than might appear at first glance. They have in common indirectness of action on the environment: the natural environment, for tools; the social environment, in the case of speech. By means of tools, man extends the sphere of his action through manipulation of some physical object that is not part of his own body. In some of the simplest instances, the tool functions as an artificial limb. A stick, for example, is an artificial hand, that will move an object that is not within reach of the hand itself. Similarly, through speech, man can bring a fellow human being to do something for him—for example, to throw down an apple from a tree, when it is beyond his own reach. It is indeed as a tool of social interaction and cooperation that speech most clearly confers an evolutionary advantage on man.

Toolmaking and speech are interrelated in yet another way. One may conceive of the utilization of very simple tools, such as sticks, as taking place in the absence of speech. This is indeed the case with tool-using primates. By contrast, at the simplest level of human tool behavior, a stick or a rock is modified in form so as to make it more useful for some intended purpose. In such instances, some symbolic substitute is plainly necessary for the object that is not yet present. The inventiveness that is required for the production of such relatively elementary devices as the fire drill is evidently far beyond the capabilities of even the most intelligent non-

humans. It demands the capacity to solve mechanical problems imaginatively, by way of constructions that will produce objects not encountered in nature. Such efforts of constructive imagination do not seem possible without the instrument of language.

When we find, in the archeological record, specific types of such purposefully fashioned tools persisting over time in the form of a definite toolmaking tradition, we see a cultural trait that, we assume, could not have come into existence without language. From its transmission we infer the operation of a fundamental function of language: the communication of already acquired knowledge. This indirect evidence makes it highly probable that the earlier nonsapiens human species, which can be shown by archeological evidence to have fashioned tools and transmitted the appropriate techniques from generation to generation, likewise had language. If the inference from this evidence is valid, then language is several million years old.

Although two or three million years seems like a very long time, it is only a brief moment in the tremendous perspective of geological time, within which life has existed for several billions of years. Language is therefore a recent phenomenon, coincident with and intimately related to the emergence of humanity itself within the evolutionary process.

The radically new type of adjustment that language makes possible clearly qualifies it as an evolutionary emergent of fundamental significance, in that it initiated a distinctly new stage of development, comparable to the genesis of life itself and to the first appearance of intelligence. Investigation of the way in which the emergence of language took place has so far produced a vast speculative literature but not yet an answer that is generally agreed on and satisfactory. Part of the perennial fascination of the problem lies in the belief that, since all the evidence points to the existence of an extremely long prelinguistic period and, since the fact that language now exists means that it must have arisen at some point in time, the problem of how it arose does have an answer. Since direct verification is impossible, however, we can never be sure that we have the correct

solution. It is also somewhat strange and disconcerting that what must have been a creature without language somehow developed into one with language, while we who have language ourselves do not know how it happened.

It is not my purpose to add still another to the theories that already exist in this field. It seems safe to assume, however, that language did not spring from nothing. It must have been preceded by and genetically developed out of something else that, while it lacked the essential qualities of language, shared with it some common formal and functional ground. The most obvious candidate for this role is communication by vocal gesture, such as is found among the anthropoid apes; in type at least, this probably represents one of the earlier stages out of which language grew. There may well have been other intermediate forms, which are not found among apes and yet are not language. In short, language is one species of a genus, the genus of communication.

From this relationship three basic and interrelated questions arise. One, which has already been broached and is, in fact, the traditional way of approaching the problem, is the question of origin: In what way did language arise out of nonlanguage during the course of historical development? The second question is definitional: What distinguishes human language as a communication system from other forms of communication? The third is psychological: What capacities are required for language behavior? Do they involve a mere increase in complexity of basically the same psychological abilities as are found in nonhuman species? Or do all other animals lack the biological endowment that is necessary for the acquisition of language, so that it is in principle impossible for them to acquire it? Some psychologists apparently believe that the more highly endowed species are in principle capable of acquiring language and have therefore tried to develop language in chimpanzees, thus far without success.

Of the three approaches indicated above—the historical, the definitional, and the psychological—we shall be concerned chiefly with the second. In a way, it is prior to the other two, for

until we have determined what is essential in human language, as distinct from other means of communication, we shall lack a criterion of success for the other two enterprises. It is not rare for theories of origin or psychological theories concerning language to be advanced in which the implicit notion of what constitutes a language is defective, in that some essential characteristic is not taken into consideration.

My own point of departure has been the view that language is only one of a number of actual or potential types of communication. Language will therefore both resemble and differ from other modes of communication. The similarity of language to certain other phenomena is prefigured in the tendency to use the word "language" in various extended senses. Thus, forms of animal communication are sometimes called "languages" in the literature on the subject. Mathematics has been regarded as a language, as in the eloquent statement by Galileo in which secrets of the universe are likened to a book that we cannot understand until we know the language in which it is written, and this language is mathematics.¹ Music is sometimes called "the universal language." With such usage I have no quarrel. My concern here is with the definition of human language in the restricted sense, and it is in that way that I use the word "language." The alternative would be to use some such term as "human language" to designate the object of my enquiry.

We have a particularly detailed account of gibbon communication by Carpenter, who lists "nine types of the more prominent and more easily differentiated sound patterns produced by the gibbon."² He notes that "their functions are extremely difficult to infer" but adds that "the fact is clear that these vocalizations as well as other sound patterns not only express excitement in an individual but also they have communicative, signaling value or instrumental value."

Carpenter describes each of these nine types in terms of stimulus situation, subjects (i.e., emitters of the signal in question), animal responding, responses, and probable function. The following examples may serve as illustrations. The second of Carpenter's nine types is a cry that is given either early in the morning or when the group is in motion. It is emitted by adult males and takes the form of single discrete calls but it may be "a series ... repeated over and

over again"; it is responded to by animals in neighboring groups, which make similar calls either simultaneously or alternately. Its probable function is described as that of localizing the group in its territory and thus avoiding intergroup conflict. The ninth type is emitted by the group leader during group progression and consists of a "chatter or series of clicks." The response of the group is to follow the leader, in this case without vocalization. Its probable function is described as that of "directing group progression."

If we view this as a system of communication, we find a number of significant differences from human linguistic communication. Of these, three are most germane to the present discussion: the nature of the "meanings" being signaled; the absence of grammatical structure; and the absence of an articulate phonetic level, as distinct from a semantic level. The nature of the meaning is suggested by the fact that Carpenter does not try to give a "translation" of the message. What might correspond to meaning he describes under "probable function," such as group localization and avoidance of conflict, as indicated in the first examples cited. The indefiniteness of the message can be seen if we do attempt to translate it. We may view it either as referential, announcing something like "This is our territory," or imperative "Keep away!" Indeed we can interpret this vocalization as merely a kind of spontaneous noisemaking, linked with rising in the morning or with a group movement that is taken to be a sign of the presence of the first group in a particular location. We are still closer to expressive behavior that is capable of being interpreted as a sign by another organism than we are to well-codified purposive communication. Even if we take it to be the latter, we may nevertheless say that it does not differentiate such modes as the indicative or the referential from the imperative. It is not so much that human language is referential while gibbon communication is not, but that human language differentiates modes, among which the referential is one, whereas in anthropoid communication there is no evidence that these are distinguished.

A second basic difference is that each gibbon cry is a separate and discrete signal, which does not combine with others to form messages that are more complex and analyzable. In human speech the unit of functional communication is the sentence, which

is analyzable into parts—roughly speaking, words; these may enter into varied combinations and most of them—that is, those parts of sentences that have independent content as against those with grammatical function—point to some aspect of the particular situation. The rules regarding possible combinations of those components may be called grammatical structure. The existence of a complex grammatical structure, in which independently meaningful elements may combine in various ways, and in which some elements may have functions remote from the simple referring to a class of present objects, qualities or activities, opens up vast possibilities that are not found in any animal communication. Man entertains hypotheses, asks questions, lies, discourses about the past, and discusses future plans: this is indeed what makes him the "time-binding animal." The gibbon can only signal about the here and now.

The third difference may appear to be more superficial—a mere technical device, as it were. But it is a technical device of vast efficacy, without which human language as we know it would hardly be possible. This difference is the articulate basis of speech, in the form of a limited number of distinct sound units, commonly called phonemes. These number from about 10 to 70 in individual languages; each of them by itself has no meaning, yet in particular sequences they form meaningful units. When speech is represented by alphabetic writing, then the individual letters or combinations of letters correspond roughly to the phonemes, and the thousands of separate words are meaningful combinations formed out of these elementary units. It is clear that the anthropoid method of individually different sounds for each meaning would soon reach a dead end, in that the number of consistently, distinguishably different calls must be rather small. On the other hand, only 10 phonemic units, themselves meaningless, will provide 10,000 different sequences of length 4 (i.e., 10^4). No other available method seems to be capable of forming the thousands of distinguishably different meaningful units of human speech.

This characteristic of human speech has been described as a duality, since it involves two levels of functioning: the sound level, in which the units are inherently meaningless phonemes, and the meaningful level, in which the units are words or other units that

are involved in grammatical constructions. Every theory of linguistic description must deal in some fashion with this distinction between phonological and grammatical level.

Of these three differences—multimodality, grammaticity, and duality—it is the second, the existence of analyzable grammatical structure in every human message, that has seemed in the past to linguists to be the most essential characteristic of human language, a sufficient basis for distinguishing human language from all forms of communication by subhuman species.

Nevertheless, the diffusion among linguists of the basic facts about the remarkable system of bee communication that has been described in the pioneering work of von Frisch has raised serious doubts about the adequacy of grammaticity as the distinguishing criterion for human communication.³ After a scouting bee has found a source of honey, on returning to the hive he begins a figure-eight dance. The speed of the dance—that is, the number of figures completed in a unit time—is related to the distance of the source; the livelier the dance, the nearer the source of honey. The direction is indicated by the angle of the dance to the surface of the hive; this corresponds to the angle of the source of honey to the sun. With the information communicated by this dance, bees who have not seen the source of honey are able to go out on their own and find it.

Bee communication evidently involves a complex signaling whole which, like the sentence in human language, is analyzable into a combination of meaningful units. In this case there are two such units, one indicating the distance, the other the direction of the source. It would seem then that grammaticity is not the exclusive property of humans and cannot be the defining characteristic of human language. Further, the most natural "translation" of a bee message seems to be referential: "There is a source of honey at a certain distance and in a certain direction." We could also perhaps interpret the message as "Come and get it!"; if we maintain the referential translation, however, then another supposedly human attribute must be shared with the bees. However, we have here pointed to the formal distinction of modes in human language rather than to the existence of any particular one—the declarative or the referential, for

example—as essential. In this sense, human language is multimodal and bee communication unimodal.

In still another way, the discoveries about bee communication have exerted a profoundly disturbing and at the same time stimulating effect on the thinking of linguists. It had often been noted by linguists that human language has a characteristic that they have called "productivity"—namely, that it is possible to interpret a message that has never occurred before. In fact, we are constantly forming and interpreting sentences that have probably never been encountered in our experience. Clearly, gibbon signaling is not productive in this sense, but bee communication is: a bee can find a source of honey by means of a message type he has never received before. Incidentally, this property of both human and bee communication rules out any very simple psychological theory of meaning, such as is based on the association in past experience between a particular message and its meaning.

Of the three characteristics described earlier, therefore, only duality would seem to hold up unambiguously as distinguishing human from bee communication. On closer scrutiny, however, it appears that we need not confine ourselves to duality and that an essential difference does appear on the grammatical level. For the bee message always contains two and only two meaningful components. Now it is not only true of human sentences that they may contain more than two meaningful units—for example, words—but that there is no limit in principle to the length of these sentences. We cannot say of a particular English sentence, however long it is, that it is the longest possible sentence; there are built into the grammar of English, and indeed of every natural language, devices by which it is always possible to build longer sentences than any given sentence—for example, by adding and the moon is made of green cheese, or by attaching an additional adjectival modifier to any noun.

There seems then to be a real difference in principle between bee communication, with its two meaningful units, and human language with its unlimited complexity of sentences. If there were a longest sentence in English, then all the sentences in the language could be listed in order of length and so numbered. Since this cannot be done,

the number of sentences is infinite. By definition, for example, the set of natural numbers is infinite: if we are given any finite set as the set of all numbers, we can always add a new one by way of the next higher number to the largest in a given set. Now all natural numbers can be expressed in English, and yet this is but a minor subset of English expressions.⁴

It might be argued that in bee communication there is also an infinity of possible messages, since there is a continuum of distance and a continuum of direction. This would be a different kind of infinity, however, that of infinitesimal differences. In practice, this argument breaks down since there are differences in the speed of the dance and in its direction that are too small to be taken into account. The absence of any limit to the number of meaningful elements in a message in human language therefore remains a basic point of distinction between it and the language of bees.

If we accept as reasonable the argument above, that bee communication does in fact have a finitude of messages, then we can see that productivity and infinity are not identical. While bee communication is productive, it is not infinite. Indeed, if a finite system has some higher-level principle of organization, it then becomes possible to understand a message that has not been received before. In the case of the bees, it is the regular mapping of distance and direction into another set of dimensions, speed and angle of dance—a mapping in which the relations of greater and smaller, more and less, are invariant—that makes productivity possible. Technically, such types of mapping are called icons. Another important difference between human language and bee communication now appears, in that there is no such regular relation between sign and meaning in human speech. The relation is rather one of arbitrariness, in the sense of the non-predictability of meaning from sound. In such cases, it is customary to speak of symbols. Thus, language is symbolic, whereas bee communication is iconic.

We have not yet, however, touched upon what appears to be the most fundamental difference, one that, as will be shown, implies all the rest and moreover helps to distinguish language from still other methods of communication than that of bees or anthropoid apes.

This characteristic we shall call "semantic universality." When we consider the semantic content of bee communication, what strikes us is its narrowness. It is concerned only with sources of honey, which is no doubt an eternally fascinating subject to bees, but still a very restricted one. In human language, we can talk about anything that bees talk about, as well as innumerable other subjects. Whenever everything that can be said in one system of communication A can be translated into another system B, while not everything that can be said in B can be translated into A, we say that B is semantically more comprehensive than A. In this sense, any human language is more comprehensive than either bee or gibbon communication.

It is also possible to assert that any natural language is semantically more comprehensive than any other system of communication. This characteristic of all natural languages is what is referred to above as semantic universality,⁵ which also seems to entail the other characteristics we have thus far found to hold for all natural languages, in contrast with the systems of animal communication we have considered. The ability to deal with such a wide range of subject matter calls for a large stock of meaningful elements; hence the need for duality, and for an infinite grammatical structure. Further, iconicity, as opposed to the arbitrariness of human symbolic communication, breaks down when it is applied to a complex or abstract subject matter, just as picture-writing is by itself inadequate to represent the structure of spoken language.

A final comparison that will prove instructive is that with another human symbolic system, mathematics. Mathematics resembles a language in that it has statements that are analyzable into individual meaningful symbols, which have combined to produce these and other messages. Moreover, infinity of messages is found in mathematics, as it is in natural languages. Indeed, this is implied in our earlier argument that the infinity of natural languages could be proved by the infinity of natural numbers expressible in it. Yet these are but one part of mathematical expressions, too, so that mathematics has not only grammaticity but infinite grammaticity. Thus mathematics has a number of those important characteristics of language that are lacking in bee communication. Yet the key characteristic of semantic universality is lacking.

It is true that every mathematical statement can be made in ordinary language. In fact, we define more complex mathematical concepts in terms of basic concepts that have been derived from everyday life and ordinary language—for example, numbers and addition. But the opposite does not hold: there is no mathematical translation of Pass me the water or Where are my glasses? or of an infinite number of other sentences of ordinary language. Two other characteristics of language that seem to survive the test of comparison with mathematics are multimodality and duality: mathematics seems to have only the single mode of assertion; further, mathematical symbols are meaningful in themselves, and are not resolvable into more elementary units without meaning, such as would correspond to the phonemes of spoken language or the letters of written language.

Of the three characteristics that have thus far remained as unique to language—multimodality, duality, and semantic universality—the first, while exclusive to human communication systems in general, seems on reflection not necessarily to be confined to language. Formal, logical symbolisms have been devised that, like mathematics, may be considered to be symbol systems and that incorporate various modes besides the indicative—for example, possibility. These symbol systems are able to express propositions of the type "A may be true."

Thus far, the term language has been used without distinction between its spoken and written forms. The former has usually been intended, since it is primary in a number of ways (to be discussed later),* of which the most obvious is that it arose earlier in evolution; every individual, moreover, learns to speak before he writes, and, indeed, many individuals who speak a language never learn to write it. In some discussions of the subject, only spoken language is meant by the term language, and the use of sound as a medium is therefore included in the definition. It has seemed more useful in the present context to consider language in terms of its structural characteristics, rather than in terms of the physical medium employed. On this basis, both spoken and written languages (and any further representations, such as Morse code, which is based on spoken or written language)

* Anthropological linguistics: an introduction, pp. 22-24.

are to be regarded as language. This is in accordance with common usage. In principle, moreover, with a few limitations, for any language that exists in both forms there is a one-to-one mapping on the sentence level. Every spoken sentence has an orthographic representation, and every written sentence can be read.⁶

There are two main systems of writing. In the phonetic system, the individual symbols correspond, with varying degrees of complexity, to individual phonemes, or in some systems to syllables. The other system may be called ideographic, in that each written symbol represents a meaningful unit, usually a word. Phonetic systems of writing reflect the structure of all spoken languages, in respect to duality, in that there is both a phonetic and a grammatical level. Ideographic systems, such as the Chinese, however, do not have duality, since there is no phonological level as such. Hence, we are finally left with semantic universality as a sufficient condition for the defining of language, in the sense in which it is employed here.

NOTES

¹La filosofia è scritto in questo grandissimo libro che continuamente ci sta aperto innanzi a gli occhi (io dico l'universo), ma non si può intendere se prima non s'impara a intender la lingua, e conoscer i caratteri ne' quali è scritto. Egli è scritto in lingua matematica. . . . Le Opere di Galileo Galilei, Voi. VI (Florence: Barbèra, 1933), p. 232.

²Reprinted in Carleton S. Coon, Reader in General Anthropology (New York: Holt, 1948), pp. 3-43. Gibbon cries are enumerated and described in the table on p. 32.

³See Karl von Frisch, Bees: Their Vision, Chemical Senses, and Language (Ithaca, N. Y.: Cornell University Press, 1950).

⁴I am indebted to discussion with Sol Saporta for this a fortiori proof.

⁵Another semantic property of natural language, which might be preferred by those who find various difficulties with the concept of translation, is the following. We can state the rules of bee communication in natural languages, but the bees cannot formulate the grammar of a natural language in their own system. Hence, natural languages serve as metalanguages for other communication systems. Parallel, then, to the distinction set forth in the text, we might say that natural languages are universal metalanguages and the only such metalanguages. That is, it is possible in any natural language to state the grammatical rules of any communication system, including that of the language itself and that of any other natural language.

⁶The marginal exceptions run here in both directions. Certain systematic aspects of sentence intonation—for example, sarcastic intonation—are not expressed in existing orthographies. On the other hand, there are some orthographic devices, such as quotation marks and capitalization of pronominal references to the Deity, that have no correspondence in spoken language.

All the sciences and humanities deal in some manner with data which are linguistic; to cite but a few examples, the documents of the historian, the informant statements of the ethnologists, the very materials of folklorist and literary studies are linguistic in form. Even the physical sciences share at least one linguistic preoccupation with disciplines concerned with human and therefore largely verbal behavior: namely, a concern with the language of science itself. However, all these other areas of study deal with language as a means to an end. Only linguistics studies languages as an end in itself. The distinction between the linguistic system as such, describable by a set of rules, and the system in actual use has been variously phrased as langue versus parole, code versus message or competence versus performance (transformational approach). However stated, it serves to delimit in a general way the province of linguistics as against the linguistic aspects of all other fields of study.

Linguistics is a social science. The very notion of language presupposes a social group which employs it as a means of communication. Linguistics, therefore, deals with the speech of an individual as representative of that of a social group, often called the speech community. Further, language as a highly complex body of learned behavior forms a part of the cultural heritage of the community which uses it. Indeed it has a central role as the fundamental vehicle of transmission of other cultural traits within and across social groups. From this point of view, linguistics may be considered a specialized branch of cultural anthropology.

The primary interest of the linguist is in spoken language. Writing and similar systems are viewed by virtually all linguists as

derivative phenomena. Speech has priority over writing in the life history both of the individual and of the race. Writing always implies some spoken form, but the converse does not hold. A further reason for assigning priority to the study of spoken language has to do with the study of language change. Writing systems are highly stable whereas spoken languages constantly change. Hence the changes in a writing system can be understood by reference to the spoken language but not vice versa. The effect of writing on speech in the form of spelling pronunciations is a real but relatively insignificant factor. Although his attention is thus centered on the spoken language, the linguist cannot but be concerned with the relation between spoken and written forms. Almost all our knowledge of past languages comes from texts which must be subject to linguistic interpretation in terms of a primary written source. In setting forth the results of descriptive analysis, moreover, the linguist himself employs a written description. He may also become involved in the practical problem of devising orthographies.

Linguistics is divided into two main branches: descriptive and historical—or, as they are sometimes called, synchronic and diachronic. Linguistics in its recognizably modern form arose in the first decades of the nineteenth century as a basically historical discipline chiefly concerned with the specific problem of the reconstruction of the ancestral Indo-European language. Interest tended to shift to problems of language description with the rise of various 'structural' schools from approximately 1920 onwards. The relation between these two main fields of study is complementary, not hostile. The degree of success of historical inquiry is in the final analysis dependent on the reliability and completeness of descriptive data. On the other hand, while a language can be described without reference to its own past, and this has been an ideal of the structuralist approach with its strict separation of the synchronic and diachronic aspects of language, it is now becoming apparent that the very description of a language is more revealing if it incorporates dynamic statements which parallel the historical processes which gave rise to it. Moreover, the historical mode of explanation inherited from the earlier linguistics of the nineteenth century still plays a fundamental role in the understanding of synchronic phenomena.

The aim of a scientific language description is to state as accurately, completely and economically as possible the structure of a language at a particular time. There are a number of differing theoretic approaches to the problem of language description characteristic of various 'schools' of linguistics. In spite of these differences the descriptions are largely convertible from one framework to another.

In view of these differences of approach, any attempt to describe linguistic theory for the specialist must steer between the Scylla of all-inclusiveness, going far beyond the purpose and scope of the present exposition, and the Charybdis of a biased presentation based on a single theory. The orientation will be towards problems rather than specific solutions. The overall purpose will be to sharpen the non-linguist reader's awareness regarding some of the fundamental issues debated by linguists and to acquaint him with some frequently encountered linguistic terms and concepts.

Descriptive Linguistics

There are three main aspects of any language description, and it would seem that, on any showing, they have a certain irreducible distinctiveness which cannot be eliminated theoretically and in practice lead to quite different sets of problems. These are phonology (the study of sound systems), grammar (the study of rules governing the arrangement of meaningful elements), and semantics (the study of meaning). There are, of course, interconnections. Morphophonemics is the aspect of language which has as its subject matter the variations in the phonological and representation of meaningful units. In English, for example, the rules regarding the occurrence of the three phonologically different forms of the -s plural: [s] as in 'hats', [z] as in 'bags' and [əz] as in 'roses' belong to morphophonemics which thus has relations both to phonology and to grammar. Again, semantics is concerned not merely with dictionary or 'lexical' meanings of individual items but with the wider task of sentence interpretation, a process which involves the

grammatical structure of the sentence as well as specific lexical meanings. The structuralist approach in American linguistics has tended to treat each of the three main aspects of language as autonomously as possible and to view semantics, since it necessarily involves extra-linguistic considerations, as external to, or even not to be included in, linguistics. The transformational approach to be discussed later does not shrink from "mixing levels" and seeks to integrate the three basic aspects of linguistics into a single integrated pattern of description.

Phonology

All contemporary schools distinguish in some manner between a level of description based on sounds (phonetics) and a more abstract level of description in terms of functioning units of the language structure (phonological level).

The basis of any description of this aspect of language is an accurate description of the sounds of the language. An indispensable tool for accomplishing this is training in the theory and practice of articulatory phonetics. The theoretical framework of this phonetics developed in its essentials in the course of the nineteenth century. In effect, this system provides a set of coordinates, almost all stated in terms of articulatory processes, that is, positions and movements of the speech organs, by means of which all possible speech sounds may be defined. Thus the English b sound in this system would be described (in an oversimplified fashion for purposes of illustration) as a bilabial voiced stop, each of these three terms referring to features of articulation, contact of the lips (bilabial), vibration of the vocal chords (voiced) and completeness of the closure (stop). A very few features are, however, faute de mieux, described in terms of acoustic impression rather than articulations. Thus pitch or fundamental frequency depends in its articulation upon the frequency of vibration of the vocal cords; this cannot be measured by non-instrumental methods. Hence pitch, in traditional phonetics, is described on the basis of acoustic impression as high, low, falling, etc.

The training of the practical phonetician includes the understanding of the theoretical framework of this system and the ability to place any sound accurately within it. The technique is largely one of mimicking and introspective analysis of the matching sound thus produced. Visual observation, e.g., of the lip movements, plays a definite but minor role. The tape recorder, by providing a virtually permanent, indefinitely repeatable, record of speech sounds, has been of great practical importance in the more accurate application of such methods. Finally, the practical phonetician must learn to apply a standard method of transcription in order to codify his results and make them understandable to others.

A second set of fundamental methods is that of laboratory phonetics. To a certain degree, these methods simply provide more objective data about articulation. By the use, for example, of the palatogram—essentially an artificial palate covered with a removable substance—it is possible to discover what part of the palate has been subject to contact in a specific articulation. In particular, recent developments in X-ray photography promise much in the area of the objective observation of speech articulations. The heart of laboratory phonetics, however, is acoustic analysis of the sound wave itself as employed in speech: a source of information obviously not available without instrumental means. Fundamental advances have occurred during the last two decades through the invention of the sound spectrograph. From a sound input this instrument produced a spectrogram in which the relative power within each of a number of frequency bands is indicated by the darkness of the impression on the paper. The subsequent invention of a speech synthesizer, by which the process is reversed so that hand-painted spectrograms are utilized as inputs with synthetic sound as output, provides another basic tool in acoustic research.

Such laboratory methods are obviously of considerable relevance to the linguist-phonetician involved in the description of specific languages. However, if only for practical reasons of time, expense and the absence of servicing facilities under field conditions, such instrumental methods cannot as yet replace the

traditional methods of practical phonetics. No one has yet been able to analyze the sounds of a language by purely instrumental means, although individual points of doubt in the analysis can often be clarified by such methods. Outside of any such practical help in linguistic analysis, it is clear that research into the acoustic nature of speech is of fundamental importance to linguistics and communication in studies.

A method very different from those already described is required in those cases where the only evidence regarding a language is in the form of written texts from a past period. The methods employed consist of highly complex inferences based on comparative linguistic methods, transcriptions of loan words into and borrowings from other languages, and the contemporary phonetic facts when study is being made of an earlier stage of a language still spoken. The results are necessarily both more uncertain and less detailed than when direct observation is possible.

The fundamental unit of phonological structure has usually been the phoneme, the basic principle of which is foreshadowed in the prescientific invention of alphabet writing. It might be thought that single principle would suffice: namely, the consistent assignment to each individual sound of a symbol. In this case the phonologic unit would correspond in a simple one-to-one fashion to the phonetic notion of a distinct sound as defined by the coordinates of phonetics as described earlier. In fact, however, there is often a multiplicity of sounds, consistently distinguishable by a trained phonetician but intuitively regarded as the same sound unit by the average speaker. For example, the average speaker of English, untrained in phonetics, is unlikely ever to have noticed that the sound spelled t in 'stop' (unaspirated) is distinct from the t in 'top' (aspirated). It is not enough to say that the difference is small, for this precise difference of aspiration or lack of aspiration of t and other stops is evidently phonemic in Hindi, Chinese and many other languages.

If the approach to a foreign language is naive, a response will be made only to those sound differences which are structurally

relevant in the investigator's language. He will thus ignore relevant differences in the foreign language where he is not accustomed to respond to them and will sometimes erroneously assume that the differences are relevant when they coincide with differences familiar to him from his own language. Thus an untrained observer will tend to arrive at essentially the same sound system for any language he describes and two untrained observers with different first languages will describe the same foreign language in different ways.

The concentration on those differences which are functionally relevant in each language has significant theoretic byproducts. It becomes evident that the sound system of every language is in a quite precise sense an organized whole. For example, the significance of aspiration in the Hindi t sound and its lack of significance in English is not an isolated phenomenon in either language. In Hindi it extends to a whole series of sounds which are paired as aspirate versus non-aspirate while in English there are no such pairs. The example of aspiration in Hindi will serve to illustrate another essential point about phonologic structures, namely, that what is involved is not so much the property of aspiration but a significant opposition, aspiration versus non-aspiration, which functions as part of the system of Hindi but not as part of English. In fact, it turns out that all sound units (phonemes) can be defined in terms of the recurrent oppositions in which they participate. This procedure is known as distinctive feature analysis.

Since, as in the instance of aspiration versus non-aspiration, such distinctive principles of contrast are binary, that is, consist of two terms, the attempt has been made to reduce all oppositions to binary ones. This approach which was pioneered by Jakobson is at present quite influential. It further seeks to reduce the total number of such binary oppositions to a relatively small number, commonly twelve, which are considered to be sufficient to account for all the sound contrast of the languages of the world. This is in part accomplished by exploiting recent advances in acoustic theory in order to use acoustic criteria of similarity alongside of the mainly articulatory rubrics of traditional phonetics.

The following is an example of this approach. A single binary opposition flat versus non-flat encompasses several contrasts which differ from the articulatory point of view. For example, the contrasts velarized versus non-velarized and pharyngealized versus non-pharyngealized are included under the opposition flat versus non-flat. In spite of their articulatory differences, they have in common acoustic characteristics. Moreover, it is found that no language employs a contrast between them. Thus we may say that in two different languages the same feature flat versus non-flat exists but that it is implemented as velarization in one language and pharyngealization in another.

Even in the present brief presentation, it is necessary to point out that an analysis which seeks to account for all structurally relevant differences in sound sequences must reckon with additional entities beyond the phoneme. Along with the succession of discrete sound units are various elements characteristic of the syllable, word, phrase or sentence which are, as it were, superimposed on this underlying sequence and can only arbitrarily be assigned a position within it. In American structural linguistics, such units have been called prosodic features, in contrast to the segmental units or phonemes proper. In England, the 'prosodic' school of J. R. Firth has emphasized such phenomena and tended to reduce the role of segmental entities, called 'phonematic units' in their terminology. Because sentence, phrase and words are grammatical units, we have here once again a linguistic phenomenon involving the relation of two fundamental aspects, the phonological and grammatical.

Grammar

The basic strategy of phonological analysis has been described as the attempt to develop a method which exhibits the functionally relevant feature of the sound system as an organized whole. It might be maintained that the most significant advances of grammatical theory have been along the same lines. The aim

has been to develop techniques through which the functional categories of each language emerge in place of an a priori set derived from traditional models of Latin grammar as applied to Western languages. It was, indeed, the challenge of "exotic languages" differing drastically in type from European languages, which exposed the inadequacies of traditional methods of grammatical analysis. At the same time, by representing each language as a unique structure, there is the danger that the basic similarities among languages may be overlooked. As with distinctive feature analysis in phonology, it is possible in this more objective and non-ethnocentric framework to isolate general characteristics of grammatical structure common to all languages. There has in recent years, therefore, been a revival of interest in such universal properties of language.

The basic problem of grammatical theory as it relates to the structure of individual languages may be characterized as the generation of an infinity of grammatically possible sentences based on a necessarily finite set of given utterances and by means of a necessarily finite set of rules.

If the number of grammatical sentences in a language were finite, they could be ordered in degree of length, and there would be some one or more finite number of sentences of maximum length. But from a sentence of any length a still longer sentence can always be formed by the addition of co-ordinate clauses, additional modifiers, e.g. adjectives, and by still other methods. Although each sentence is itself of finite length, the number of sentences in any language forms what mathematicians call a countable infinity. Grammars, therefore, cannot take the form of a simple finite enumeration of sentences. This is confirmed by everyday experiences in that speakers constantly understand and make up sentences which they have never encountered in their previous experience.

The possibility of a grammar which generates an infinity of sentences arises through the existence of constructions in which the same finite class of words can occur repeatedly without limit

e.g. adjectives modifying a single noun), as well as by more complex indefinitely repeatable processes (e.g. coordination of clauses). It follows, then, that in one guise or other, at least some grammatical statements must be in terms of such classes of finite membership. Traditional grammar has made us familiar with the most inclusive of such classes, the so-called parts of speech. The most common variant of traditional grammar, based on a fixed set of parts of speech and even on a fixed order of treatment among them, has furnished the ground plan of innumerable grammars.

Such a grammar consists of two kinds of statements. The first, or morphological, concerns variations in form, that is, constituent sounds, particularly those connected with the functioning of the same part of speech in different constructions (inflection). Here then belong the tables of conjugation and declension. The second type of statement has to do with the use rather than the form of parts of speech. In fact, it becomes a statement regarding the meanings of inflectional categories. The two types of statement define a dichotomy between form (morphology) and use (syntax). Thus, in a traditional Latin grammar a morphological section states, say, that the ablative singular of vir ('man') is viro while the syntactic section includes a description of the uses of the ablative under such rubrics as 'the ablative of separation', 'the ablative of instrument', etc.

The heart of this doctrine is obviously the notion of parts of speech. It presupposes a universally valid set of categories (noun, verb, etc.) believed to be present in all languages because they are necessary to human thinking. The definition is thus necessarily semantic.

The reaction against this scheme largely developed in terms of a rejection of universal a priori semantically based definitions or isolating the classes of elements to be employed in grammatical description. In consequence a formal (i.e. non-semantic) approach to the definition of grammatical categories arose. Such classes were

defined in terms of morphological behavior: for example, by their occurrence in certain inflectional categories as marked by affirmatives of specified phonemic shapes, or by their occurrence in the same or similar environments. To say that elements occur in the same environment is tantamount to saying that one can substitute for another. Hence the definition of classes by substitution became a key operation in structural linguistics, particularly in its American version. These techniques often led to the isolation of classes of meaningful elements which departed widely from the traditional model, even for familiar languages, e. g. English.

Still other procedures of structuralism undermined even more decisively the very concept of parts of speech which constitutes the core of the traditional scheme. It is obvious that traditional analysis requires that the basic unit of grammatical description be the 'word'. Morphology is the study of the formal (phonologic) internal structure of the word, and syntax has reference to its use in the sentence. It should be noted that in this usage some term such as paradigm is perhaps more appropriate than word. Thus in the traditional view man, man's, men and men's are all variants (accidents or inflectional forms) of the same underlying word. But the search for a minimal unit corresponding to the phoneme in phonology led to the postulation of a unit smaller than the word as a basis for grammatical theory. This unit, first introduced by Bloomfield, was the morpheme, defined by him as the minimum meaningful unit. Thus, a word such as 'farmers' would consist of three morphemes: farm-, -er- and -s. In this way, inflectional elements likewise become morphemes, so that the above-mentioned paradigm of man is dissolved into morpheme combinations.

A consistent attempt was made to develop an overall theory of linguistic description based on the phoneme and morpheme as the two basic units and with a good deal of parallelism in the analytic procedures involved in both. This finds its classic expression in a paper by Z. Harris, in which, by repeated substitution procedures on higher and higher levels, there is a gradus ad Parnassum from the morpheme to the sentence. The word level appears here only

acitly, so that for all practical purposes, the old morphology-syntax division disappears. Form variations formerly handled in declensional and conjugational tables with words as units are treated as allomorphs (i. e. variants) of the same morphemic unit, e.g. -en is an allomorph of the plural morpheme in the environment
 . . . ox-

The morphophonemics of the language is then comprised in a set of statements describing all such varying shapes of morphemes and constitutes, in this scheme, a distinctive compartment of the grammar. The connection with phonology is via what Hockett called the principle of accountability, according to which, as far as possible, every phoneme is assigned to one and only one allomorph in a specific context.

The model sketched is, basically, one of several distinct levels, each with minimal units and with rules which describe the variants of each unit and the combinations in which it occurs with units on the same level. This general model which has numerous variations in theory and practice has been widely influential and many grammars have been written in accordance with it. In particular the type known as tagmemic and developed chiefly by J. R. Pike has been employed by linguistic workers affiliated with the missionary-oriented Summer Institute of Linguistics in the description of many languages throughout the world.

A fundamentally different model, commonly known as the transformational, first attracted attention in 1957 with the publication of N. Chomsky's Syntactic Structures and, at the time of writing, had clearly assumed a dominant position within American linguistics. During the first ten years of existence it has itself undergone considerable changes and it seems clear that its development is by no means closed. Hence any discussion of its basic outlines at the present time is subject to the promise that this model is quite likely to undergo further drastic changes in the future.

A transformational grammar is a subclass of the generative type of grammar. In general, the notion of a generative grammar

requires use at the start of a set of primitive symbols, normally a single one, symbolized S (= sentence). For any particular language, by various rewritings and further manipulations in accordance with the given rules, a succession of strings, each consisting of a sequence of symbols, is generated. As constituted at present, such a grammar consists of base rules, a lexicon, a transformational component, and sets of phonological and semantic interpretation rules. The base consists of the base rules and the lexicon. It produces the abstract underlying structure of the sentence, the so-called deep structure. In principle, this is sufficient for semantic interpretation of the sentence since it contains all the relevant grammatical and lexical information required for sentence interpretation. The transformational component, whose form of rules is different from that of the base, produces a "surface structure" from the deep structure of any sentence. This in turn undergoes the phonological rules to produce a sequence of symbols subject to phonetic interpretation. As currently practiced, binary feature analysis is employed in phonological representations and semantic feature analysis in the lexicon and in the semantic interpretation. Semantic features will be briefly described in a subsequent section.

This scheme has not yet been applied in its entirety to any language but a fair number of partial descriptions have been produced in accordance with the earlier forms of the transformational model. In general, this approach differs from the phoneme-morpheme model in a number of ways. In the former, there are units which are supposed to be discoverable by procedures applied, ideally at least, in a mechanical way from a given body of actual utterances. Hence sentences in their overt forms as sound sequences are ultimately described and classified in terms of such units and their combinations. In the generative approach, there is rather a sequence of abstract structures which do not assume the form of the actual sentence until the operation of semantic and phonological interpretation. The adequacy of particular alternative formulations is judged in relation to the overall structure of rules for the entire language with the aim of incorporating to the maximum extent the possibilities of generalization within the

description. The ultimate aim is the justification of such choices in terms of their applicability in principle to all linguistic descriptions, .e. their universality.

Levels are distinguished not in terms of the nature of the units which occur in them but on the logical form of the rules of which they consist. By incorporating semantic interpretation rules as well as phonological rules, this model seeks an overall integrated theory of linguistic description. The grammatical aspect, here generally called the syntactic, has, as can be seen, the central position in that it generates the underlying structures subject to semantic and phonological interpretation.

Semantics

A central problem in semantics, traditionally the basic problem, is the statement of meanings in terms of definitions, whether the language is the same (periphrasis) or different from (translation) the object language. This has been primarily the task of the lexicographer or dictionary-maker. The division between the written productions commonly called grammars and dictionaries, however, does not completely coincide with the division of the subject into grammar and semantics. Certain kinds of meanings, e.g. those of inflections, are treated in grammars, at least in traditional ones, and are almost never found in dictionaries. On the other hand, the assignment of words to paradigm classes, e.g. the gender of nouns in French and irregularities of morphological formation, particularly the former, are regularly included in dictionaries. Thus, a grammar of French will describe the phenomenon of grammatical gender and give rules relating to agreement in gender, but it will not normally list all masculine and feminine nouns.

Lexicography is still very much an art learned by apprenticeship or unguided imitation of existing dictionaries with relatively little in the way of codified principles or theoretical elaboration.

It is significant to note that the lexicographic aspects of hitherto unwritten languages or of those with a minimal written literature are quite different from those of established or standardized literary languages. Oral information from informants rather than published texts provides the basis for entries. Moreover, the languages are frequently parts of non-Western cultures with which the dictionary-maker or the non-indigenous user may not be familiar. The lexicographer, in these instances, finds his task extraordinarily close to that of the ethnographic fieldworker. Indeed, a really first-rate dictionary cannot be compiled under these circumstances without coincident investigation of non-linguistic culture and is itself an ethnographic document of first-rate importance.

There is, then, an absence of an organized theoretical framework in the actual practice of the dictionary-maker. Nevertheless, there have been important developments in recent semantic theory, none of these as yet incorporated in full-fledged dictionaries, which bid fair ultimately to alter this situation. The most important development here has been a notable gain in the precision of methods based on the semantic analysis by features, which was inherited from the earlier theoretical literature of semantics. These methods have been employed with particular success in the area of kinship terminologies and the basic principles have been adopted into the program for semantics being developed by transformational theorists as noted earlier.

Some of the basic notions of semantic feature analysis can be illustrated from the set of kinship terms in the English language. Each particular term, e. g. 'brother', 'aunt', can be defined by reference to a set of features which recur elsewhere in the system. Most of these features are, as in phonology, binary. A simple and not entirely adequate model which will, however, illustrate these principles is the following. We have a set of the following features: sex of the person referred to, lineal versus collateral, consanguineal versus affinal, generation. All except the last of these is binary. The term 'uncle' is then defined as male, collateral, consanguineal, first-ascending generation. Just as in phonology, there is a restricted universal set of features and every language utilizes only

some of them. For example, English does not use the feature 'sex of the speaker' but for some Bantu languages, this category appears in the existence of distinct terms of reference for a male sibling in relation to a male sibling as against a female sibling in relation to a male sibling. On the other hand, many systems, unlike English, do not distinguish lineal from collateral relatives.

Comparative Linguistics

Great as is the value of descriptions of the thousands of the world's languages from both the practical and the theoretic point of view, it can be argued that description is but the initial task of linguistic science. Only by comparisons of languages can either law-like generalizations or specific historical conclusions be derived from linguistic study.

Historical Method

One basic type of comparison is that of two or more historical stages of the same language. This, the direct historical method, depends on the existence of documentation for the earlier periods of the language. Historical depth can also be attained by the comparative method, which involves the systematic comparison of related languages in order to reconstruct the ancestral language from which they have sprung. A specialized aspect of the comparative historical method is the intensive study of dialect variation within a single language, for such inter-dialectal relationship can be considered the limiting case of closest relationship. This field, which has a highly developed set of techniques, is called dialect geography. Its characteristic production is the dialect atlas, in which the geographical distribution of linguistic features within the total language area is mapped. In principle, social stratification of linguistic forms on class and occupational lines is likewise an aspect of linguistic variability within the bounds of a single language, but this area of study is still in its infancy.

The concept of genetic relationship of languages, the bases

of comparative historical linguistics, is an extension of the notion of dialectic divergence over a longer time span. The dialects of one period become the separate but related languages of a later time. Language is always changing, and no language spoken over an extensive area can maintain full and equal communication within the entire speech community. A further factor in language change is migration, which may result in a community of speakers who are permanently removed from frequent and easy communication with the home community, i. e. Dutch in South Africa which evolved into a separate language, Afrikaans. Under the conditions just outlined, linguistic innovations, which may occur in all aspects of language, tend not to diffuse over the communication barriers; the results are local differentiation or dialects, as they are called. As the process continues, the dialects shift further apart beyond the point of mutual intelligibility. Each of the new languages which arises in this way may itself once more undergo the same splitting process.

The recovery of this sequence of events leads to the postulation of a family tree or genetic classification of languages. Hypotheses of this kind are based on shared resemblances which are retentions, though often in a modified form, from the original period of linguistic unity. The systematic comparison of such related languages leads to the reconstruction, as far as may be possible, of the traits of the ancestral language and the processes of change in the languages during the intervening period. A fundamental part of this method is the technique of determining sound correspondences. Sound change is regular in that a phoneme in a particular language changes to another phoneme virtually without exception under stated conditions, these conditions themselves being phonetic. Sometimes all instances of a phoneme change under all conditions (so-called unconditioned sound change). An example of a conditioned change is the shift from earlier t in German to s (written ss) in non-initial position and to ts (written z) in initial position. Since in English t did not change under these circumstances, there have resulted two sets of correspondences between English and German. Initially, German ts = English t, as in zwei: two; Zunge: tongue, etc.; non-initially, German s = English t, as in beissen: bite; schliessen: shoot, etc. An example of an unconditioned change is

the shift of Anglo-Saxon \bar{a} to modern English o, e.g. hām: home; stān: stone, etc.

An understanding of regular sound changes and a number of other processes of change permits, by a kind of triangulation, the determination of features of the parent language. Such comparative study is most advanced in the case of the Indo-European languages, but it has been applied successfully to closely related groups of languages in many parts of the world, even in the absence of earlier written records. An incidental but important by-product is the sorting out of resemblances among both related and non-related languages which result from borrowing rather than descent with modification from a form in the ancestral language.

It is evident that the most important contributions of linguistics to historical research lie in this area. Until recently, conclusions of this kind have lacked the all-important aspect of absolute chronology. Since about 1950, however, Swadesh and others have developed a method called glottochronology, which attempts to fill this gap. The fundamental assumption of glottochronology is that the rate of change by replacement within a standard vocabulary list is reasonably constant for all languages. The absolute value is calculated from a number of documented cases from earlier and later stages of the same languages in Europe and the Near East. If it is hypothesized that attrition in related languages is occurring independently at this rate, then there will be an expected number of common retentions, the so-called cognate forms. From the percentage of cognates in such cases it is possible to derive an estimate of the chronological date at which divergence within the original unified speech community began. Recently both the empirical and mathematical bases of the theory have come under sharp attack.

Typologic Method

Another type of comparison has come into renewed prominence in recent years. This is typologic comparison and classification in which the criteria employed refer to similarities which may arise

without any necessary implication of historical connection through either contact or common origin. Languages can have noun case systems, for example, which considerably resemble each other in the semantic categories but which do not have corresponding similarities in the sound sequences which express these categories. Thus certain Australian, Caucasian, Indo-European, Amerind, and other languages in all probability have independently developed systems of case inflection in the nouns. To cite but a few instances of a widespread phenomenon in phonology: Ewe in West Africa, Chinese in Eastern Asia, and Zapotecan in Mexico, make use of pitch distinctions in their phonemic systems although the languages have had no historic connection.

Non-historical comparison using such criteria leads to classification of languages into types. The complete absence of certain logically possible types and the significantly different frequencies of others evidently lead to generalizations about human language as a whole. In the past there has been a tendency to confuse typological and genetic criteria for resemblances, but the growing clarification of this problem has tended to elucidate the legitimate role of typological comparison in the development of both synchronic law-like generalizations and diachronic regularities governing the change of type.

Other Linguistic Disciplines

In addition to the two core fields of descriptive and comparative linguistics just outlined, a number of more or less peripheral, though definitely related, topics possess the common characteristic of having fairly direct relevance to other disciplines. In certain instances the area of common interest is sufficiently extensive to have given rise to nascent subdisciplines, notably psycholinguistics and ethnoinguistics. In the present context the emphasis is on common ground with other social sciences, and no consideration need be given to such fields as semantic analysis, an important joint interest of linguistics with logic.

Because language is a part of culture, and linguistics,

From this point of view, may be considered a branch of cultural anthropology, the relationship between language and other aspects of culture has naturally become a concern of anthropological linguistics. This rather vague area of knowledge is often called ethnolinguistics. Among its basic problems is the determination of the role of language in the transmission of culture from one generation to another (enculturation) and from one culture to another (acculturation). Studies have been made, for example, of the changes induced in one language by contact with another in the context of the general culture-contact situation, including its non-linguistic aspects. Another set of problems has to do with possible correlations between language, particularly in its semantic aspect of classification of concepts, and non-linguistic cultural behavior. The by now classic anthropological topic of the relation between kinship terminology and patterned kinship behavior is an example of this. But the sharpest issues in this area have been raised through the largely posthumous interest in the writings of Benjamin Whorf. The Whorfian thesis or 'linguistic Weltanschauung hypothesis', as it has been called, in its most extreme interpretation would assert that the general 'world view' of its speakers is determined by, or at least mirrored in, the categories of the language which they speak. This thesis has aroused wide interest and has been the stimulus both for analytic discussion and for cross-cultural psychological experimentation.

Like ethnolinguistics, the merging subdiscipline of psycholinguistics does not as yet have a clearly delineated set of problems or techniques. In order to give a general notion of its contents, a number of topics generally considered relevant may be mentioned here. These include the psychological processes in language-learning, whether of first or subsequent languages, and in language-loss in the pathological condition known as aphasia; the study of sound perceptions in speech; and the psychological aspects of meaning interpreted as the reaction of subjects to words operating as stimulus objects. This last type of interest has given rise to the semantic differential as an instrument to measure meaning as response along a set of dimensions.

Even more recent is the interest in what has come to be

called sociolinguistics, including such topics as: the relation of language differences to social class; the differential social roles of different languages coexisting in the same society; the development and spread of lingua francas as auxiliary languages in multilingual situations; the factors involved in the differential prestige ratings of languages; the role of language as a sign of ethnic identification; language in relation to nationalism; and problems of language policy, e.g. in education. This area has become a focus of interest largely because of problems arising in developing areas.

Still another aspect of language, namely its employment as a medium of aesthetic expression, must also be considered. There is a purely linguistic side to the characterization of individual and folk style in written and unwritten literature. Linguistic considerations also enter into the description and analysis of differences between prose and various poetic types of language. One particular poetic device, meter, cannot be analyzed without reference to strictly linguistic factors. The use of language in song, for example, the relation between linguistic and musical pitch patterns in tone languages, raises at least partly linguistic considerations. Departing somewhat from the strictly aesthetic aspect, one may also consider the ritual use of language, secret languages, the linguistic aspect of drum and other communication based on language and the playful modification of language involved in tongue-twisters, dog-Latin and similar devices.

NOTE

This is a revised version of "Linguistics," in Robert A. Lystad (ed.), The African World: A Survey of Social Research (New York: Frederick A. Praeger, 1965), Chapter 15, pp. 415-428.

The number of languages in the world may be estimated as between five and ten thousand. This vast linguistic diversity is but one facet of human sociocultural diversity in general. The term 'universal' is well established in cultural anthropology and sociology to designate those properties of human cultures which are found in all groups; for example, tool-making and the existence of organized social institutions and belief systems. Lists of such panhuman cultural traits have been drawn up from time to time by cultural anthropologists. The following is a well-known example of such a list: speech, material traits, art, knowledge, religion, society, property, government, and war. Each item furnishes a component of a "universal culture pattern" as described by Clark Wissler in 1923.¹

It will be noted that each of these items is a highly general rubric, such as might form the topic of a chapter in the ethnographic description of a particular people. To posit the existence of universals of this type involves the assertion of the basic comparability of all cultures. As minimal as such a claim may seem, it is in fact a basic achievement of the last century of anthropology to have demonstrated that all human groups, however simple their technology, possess coherently structured institutions which include functional equivalents of all the basic categories of the technologically most advanced societies. Indeed these results have still not fully penetrated popular consciousness. For example, in respect to language, it is still widely believed that the languages of the technologically simpler peoples are themselves simple and lack fully articulate sound systems and well-defined grammatical rules.

It is obvious that such a list as that of Wissler cited above lacks specificity in that it merely asserts, for example, that all peo-

ples have speech and government without delimiting in any fashion the kinds of languages or governments that may be found in human groups. There has emerged in the last two decades within anthropology the so-called cross-cultural approach. This involves a systematic comparative study of particular human institutions in order to determine what more detailed universal statements may be made regarding human societies.² In a manner quite parallel to that to be described here for linguistic studies, the cross-cultural approach has broadened the logical basis of the concept of cultural universal. It has not only admitted such statements as "all human societies have marriage institutions" but also allowed for relationships among variables in order to demonstrate, for example, that certain forms of marriage show a significant statistical relationship with other human institutions, that is, residence rules, kinship terminology, and inheritance.

Historical Background

The topic of language universals has gone through several stages. In what may be called traditional grammatical theory, languages were described by means of a set of categories of presumed universal validity. Among these were the parts of speech and the bipartite division of all sentences into a subject and predicate. The conviction of the universal applicability of such categories was based on the assumption of man's rationality and the concomitant view that language as the instrument of thought must conform to the normative requirements of coherent discourse. Thus the grammatical subject-predicate form of sentence was the linguistic counterpart of the necessary logical form of propositions.

The actual categories were ultimately derived from the Western Greco-Roman grammatical tradition. If, in fact, all languages have the same basic form, the historical accident that linguistics employs those which have developed within the Western cultural tradition will not cause any particular difficulty.

It gradually became apparent, however, that this was not the case. As languages such as those of American Indian groups

and those of Africa and Oceania, began to be the subject of serious study the traditional categories were more and more viewed as traitjackets. They forced an analyst to impose categories often not functionally relevant to the language being studied and to ignore others which were.

It was essentially because of these difficulties that various "structuralist" approaches developed in the last 50 years or so and came to dominate scientific linguistics. There were and are a number of schools of structuralism in Europe and the United States. Common to all, however, is the basic concept of "structure." Every language is an organized system which must be described in its own terms without the imposition of the observers' ethnocentrically derived categories. To a great degree and in ways which cannot be elaborated here, structuralism developed methodologies which enabled the linguist to describe each linguistic system in its own terms.

Structuralism, particularly in its American variants, tended to emphasize the differences rather than the uniformities of language.³ This was natural enough since the structural approach itself grew out of problems connected with the diversities of language. Except for a very few, almost commonplace observations, all that was common to languages seemed to be merely the consequence of the universal applicability of the methodological procedures themselves. For example, phonemic theory provided the method for discovering the basic sound units, "phonemes," of each language. Hence, every language had phonemes, but each language had its own particular set and little in the way of general principles was presumed to operate in regard to these individual systems.

Within the last decade, however, there has been a marked resurgence of interest in the study of language universals. One may point, in particular, to two developments. One was the conference on language universals held in 1961 under the sponsorship of the Committee on Linguistics and Psychology of the Social Science Research Council. This conference, whose results were published in book form,⁴ involved the participation of leading linguists, anthropologists, and psychologists. The second major development was the central place

which the topic of universals has come to occupy in the theoretical framework of the generative transformational school of linguistics, now the dominant trend in American linguistics.⁵ These recent developments have been marked not only by a revival of interest and much substantive work but also by theoretic innovations.

My own interest in the subject was largely stimulated by the first of these developments. Continuing contact and collaboration with psychologists as a member of the Social Science Research Council Committee on Linguistics and Psychology served to focus my interest on the universal aspect of language. Both the neglect at that time of this topic in American linguistics and its key significance for psychology as well as other sciences dealing with man became apparent in our mutual discussions and activities leading, ultimately, to the 1961 conference on the topic. The approach outlined here, which is chiefly but not exclusively typological, derives largely from these initial interdisciplinary contacts and has continued along lines arising from this stimulus.

Language Diversity

It was not merely theoretical prepossessions which in the past discouraged research in language universals. As the panorama of the world's languages unfolded, nearly every familiar landmark seemed to disappear. Language differences run deep and are not to be lightly dismissed.

To understand something of the extent of interlinguistic diversity we may compare English with some other language, such as French. Even such a very limited comparison will suffice to refute many universal hypotheses. Thus the existence of nasal vowels in French but not in English and of interdental fricatives (the th sounds of thin and this) is sufficient to destroy the hypothesis of the universality of these two sets of sounds. Even where the phonetic similarity is great enough for the sounds of the two languages to be equated there will often be important phonetic differences. Thus, the t of French, which is dental and unaspirated, is not the same as English t, which is alveolar and has varying degrees of aspiration

depending on complex rules. In grammar, French has a system of grammatical gender in the noun without any real parallel in English, showing that grammatical gender is not a universal. Even in vocabulary, outside of perhaps certain scientific and technical vocabularies, there is frequent disparity. Thus, corresponding to English "to know" are the common French equivalents, connaître and savoir.

Yet French and English are likely to be more similar than just any two languages chosen at random, since they are both Indo-European and their speakers have participated in a common Western European cultural tradition. We may expect the differences between English and unrelated languages with a long history of separate cultural development, such as Chinese or Navaho, to be far greater. In studying a language like French there will still be important common ground for the speaker of English that will appear so self-evident that it will generally not obtrude into his consciousness. Thus French nouns, like English, distinguish singular and plural. However, one does not have to seek far to find languages, such as Chinese, which have no grammatical distinction of number in the noun. One can express plurality when it is so desired, but Chinese nouns, unlike those of English and French, do not have two forms of the noun with compulsory choice of one or the other.

Typology

Let us consider further the example of nominal plurality just described. It would seem, on the face of it, that we cannot make any universal statement since some languages, like English, have a grammatical distinction between singular and plural and some, like Chinese, do not. Instead of asking, however, whether the distinction of singular and plural exists in all languages, the answer to which, as has been seen, will be negative, let us ask a different sort of question, one based on the concept of type. We may say that English and Russian, which distinguish singular and plural, belong to one type of language in regard to the category of number, while Chinese and Malay, which do not make the distinction, belong to a second and different type.

We may now consider the category of number more systematically from the typological point of view. We will inquire whether there are other types than the two exemplified by English and Chinese. Our first goal will be an exhaustive enumeration of types. Further investigation will disclose that the English and Chinese types are not the only ones. A fair number of languages in different parts of the world possess an additional category, the dual number. A well-known instance is Classical Greek, in which we have, for example, (in the nominative case) ánthrōpos, "a man" (singular), ánthrōpō "two men" (dual), and ánthrōpoi, "more than two men" (plural).

Having enumerated the types which are to be found, our next step is to ask the following questions.⁶ What are the logically possible types of systems for the category of number in the substantive? If there are more numerous than those which are known actually to occur, can we state any general principles which govern this particular choice of the actual types from among the possible?

It is, as a matter of fact, not at all difficult to conceive of possible systems for the category of number which are not empirically exemplified in any natural language. Indeed there are an infinite number of such systems. Let us imagine a language in which there are two grammatical categories, A and B. The first, A, is used whenever we talk about a collection with an odd number of objects, and the second, B, whenever we refer to a set with an even number. No such natural language exists, of course. The arithmetic of odd and even which underlies such a hypothetical grammatical system is, of course, just a special case of modular arithmetic, that with modulus two. Since we can obviously construct a system of categories with any natural number whatever as the modulus, there are an infinite number of such systems. There are also an infinite number of other ways that such systems could be generated. For example, given any infinite sequence whatever among the natural numbers, one grammatical category might apply whenever we referred to a set which contained a number of objects which was a member of the sequence and the other whenever we did not.

In light of the infinity of possibilities it becomes rather more impressive that natural languages, while they do not all have the same

system, are confined to one of only three such systems.

The next question is the following. Are these three systems a mere random selection among the infinity of possible systems, or can they be delimited in some systematic fashion?

Let us put in correspondence with each grammatical category the set of cardinal numbers of the sets of objects to which the grammatical category applies. The three empirically found systems can be enumerated:

I. (1, 2, 3, . . .); for example, Chinese

II. (1) (2, 3, 4, . . .); for example, English

III. (1) (2) (3, 4, 5, . . .); for example, Classical Greek

As we have seen, a system of grammatical numbers corresponds to a particular kind of partition of the positive integers. Formally, a partition \underline{P} of the positive integers corresponds to a system of grammatical numbers only if it satisfies the following two axioms:

Axiom I. Every partition contains \underline{n} sets,
where $\underline{n} = 1, 2, 3$

Axiom II. Every partition contains the set consisting of the integers $\geq \underline{n}$, where \underline{n} is the number of sets

Each of the three systems enumerated above satisfies these axioms, and no other system does.

Another example in which the number of types is finite and can thus be enumerated and examined separately is the following.

There is a set of consonant sounds, called implosives, found in a number of American Indian languages and in a fairly large number of languages in Africa and Southeast Asia. In the formation of such sounds the air chamber between the glottis and some supraglottal position in the speech tract, for example, the lips, is increased in

volume by lowering the glottis, thus rarefying it. When the supra-glottal closure is released the air will momentarily rush in since the rarefication of the air in the chamber behind the supraglottal closure has decreased its pressure in relation to the air in front of this closure.⁷

Implosives may be classified according to the place of supra-glottal closure. There are four main points of closure which are involved. These are shown schematically in Fig. 1 in relation to the glottal point of closure.

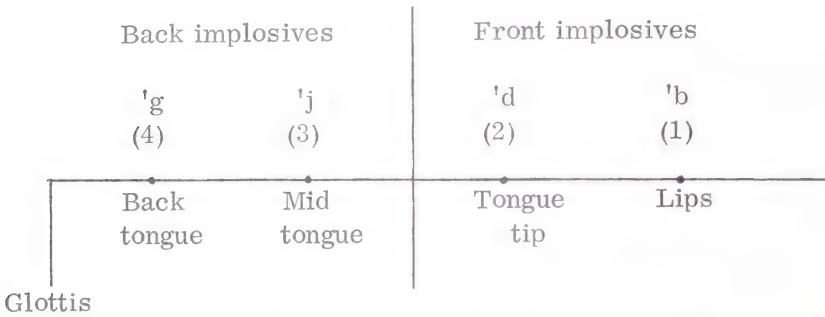


Fig. 1. The main types of implosive sounds.

The main division lies between points (3) and (2). Implosives produced at points (1) and (2) may be called front implosives and those at (3) and (4) back implosives. We can now enumerate the logically possible types of languages with regard to implosive sounds by referring to the presence or absence of (i) front implosives and (ii) back implosives. Since there are two properties, each of which may be present or absent independently of the other, there are four possibilities.

- 1) Front and back implosives may both be present. An example is Angas, a language of Nigeria with implosives at positions 1, 2, 3, and 4.
- 2) A front implosive is present but back ones are absent. An example is Zulu in South Africa which has only one implosive, at position 1.

3) Front implosives are absent but at least one back implosive is present. No such language is known.

4) Both front and back implosives are absent. The vast majority of the world's languages which, like English, have no implosives, belong to this type.

We see once more that a logically possible type, namely, that which has back but not front implosives, is not found. This result, like our previous one regarding the category of number, seems to be a negative one. Indeed, we might describe the overall purpose of linguistic science in its generalizing aspect to be the delimitation of the concept "humanly possible language" among the infinity of abstract possibilities.

However, all such statements as the foregoing about the non-existence of certain types are logically equivalent to positive statements with the limitation that they are implicational, that is, conditional in form. The equivalent of the statement that there are no languages which have back implosives but no front implosives is the implicational proposition that the presence of back implosives implies the presence of front implosives.⁸

Such implicational statements turn out to be very numerous in all aspects of language, far more numerous than "absolute" universals of the type "all languages have vowels." There seems very good reason to admit such statements as universals. Their logical scope is universal since the reference set is that of all languages. Thus the foregoing statement regarding implosives could be logically paraphrased as follows. For all x , if x is a language, then if it has at least one back implosive it always has at least one front implosive. Scientific generalizations always hold only under certain stated conditions and, in fact, universal implications have often been proposed as the typical logical form for scientific laws.

Perhaps more important than these general considerations is the fact that the inclusion of implicational along with absolute generalizations about language is fruitful in linguistically relevant results. Linguistic universals, including the implicational ones, tend to form

coherent groups instead of being isolated statements. The basis of this cohesiveness is that a whole set of them will point to the same hierarchy among linguistic features; that is, they will provide evidence of a panhuman system of preferences.

The relation between implications and a preferential hierarchy rests on the following consideration. The implied is more fundamental than that which implies it since the former may be present without the latter but the latter can exist only in the presence of the former. Thus front implosives are preferred or are more fundamental in human speech because they are implied by back implosives which cannot occur without them. But the relation is asymmetrical since the front implosive, the preferred type, can occur without the back implosive being present.

The example just discussed is, as presented up to now, an isolated one. In the next section we shall consider the possibility of broader principles; that is, higher level principles which are common to whole sets of universals, each of which points to some one hierarchical relation.

Phonological Hierarchies and Marked Features

As a further example of a hierarchical relation in phonology, we will consider the feature of nasality in vowels. In the production of nasal vowels the back extremity of the soft palate (the velic) is not raised, so that the entrance to the nasal cavity is not cut off. As a result air escapes both from the mouth and the nose. In the nonnasal vowel, also called the oral vowel, the velic is raised so that the entrance to the nasal cavity is closed and the air escapes from the mouth only.

There are a whole series of universals all of which point to the preferred status of oral over nasal vowels. Among these are the following. The presence of nasal vowels in a language always implies the presence of oral vowels but not necessarily vice versa. That is, a language may have oral vowels without nasal vowels, but it can never have nasal without oral vowels. A second statement is that the

number of nasal vowel phonemes is never larger than the number of oral vowel phonemes. They may be equal in number. A large group of languages, including French, have fewer nasal than oral vowel phonemes. No language has been found, however, in which the number of nasal vowels is larger than the number of oral vowels. A third regularity which leads to the same hierarchy is that the frequency of nasal vowels in text is always less than that of oral vowels.

The fact that a number of separate statements of universal scope all suggest the same relationship between oral and nasal vowels, namely, that the former are more basic than the latter, obviously increases the reliability of this conclusion. Moreover, there are other such "clusters" of universals, each one serving to establish with a high degree of probability some particular hierarchical relationship among classes of sounds.

Given a whole series of such results we can ask if still higher levels of generalization are possible. Are there any properties which distinguish favored articulations as a group from their alternatives? There do, as a matter of fact, appear to be several principles at work. There is room here to discuss only one of these principles, but it is one which accounts for a considerable number of clusters of phonological universals as well as having some application, when appropriately broadened, to the grammatical aspect of language as well. This is the principle that of two sounds that one is favored which is the less complex. The nature of this complexity can be stated in quite precise terms. The more complex sound involves an additional articulatory feature and, correspondingly, an additional acoustic feature which is not present in the less complex sound. This additional feature is often called a "mark" and hence the more complex, less favored alternative is called marked and the less complex, more favored alternative the unmarked.⁹ Thus the nasal vowels, as has been seen, are less favored than the oral vowel. They are more complex; they involve an additional resonance chamber, the nasal, besides the oral chamber which functions alone in the oral vowels.¹⁰ Again, nonglottalized consonants are favored against glottalized. The latter are like the former except that the glottis is closed simultaneously with the consonantal closure while, with the nonglottalized,

this closure is absent. The general principle involved is evidently of broad application and allows us to deduce many specific universals that can then be subject to empirical test.

It may be noted that the approach outlined here avoids the circularity for which earlier formulations, such as those of Zipf,¹¹ were attacked. Such theories stated that there was a general human preference for "easier" sounds but when the question was raised regarding which sounds were easier the operational definition appeared to be "those which are favored." In the present instance, panhuman preferences were investigated by formulating universals based on the occurrence or nonoccurrence of certain types, by text frequency and other evidence, none of which referred to the physical or acoustic nature of the sounds. Afterward, a common physical and acoustic property of the favored alternatives was noted employing evidence independent of that used to establish the universals.

Marked Features in Grammar

The more basic fact underlying the concept of marked and unmarked, and of other principles that might have been cited, is that of hierarchy. Such hierarchical relations are just as basic in grammatical and semantic aspects of language as in phonology. A principle quite analogous to that of marking in phonology is also operative in grammar and semantics and goes by the same name.¹²

In order to illustrate this principle in grammar, we return to the category of number in the noun which was the topic of earlier discussion. In English, which has the singular-plural distinction, the formal expression of the two is quite different. The plural for the vast majority of nouns is symbolized by a suffix -s.¹³ The singular, on the contrary, has no overt expression. In fact, we might say that the plural is formed from the singular by the addition of an -s suffix, and it is often so stated in traditional grammars. It seems not too farfetched to consider this -s as analogous to the additional phonetic mark of the more complex category in phonetics. This

would suggest that the plural is in some fashion more complex than the singular.

There are a number of indications that this is a reasonable assumption, so that we can consider the singular as unmarked in relation to the plural as the marked category. First, the marking of the plural is not an idiosyncratic feature which is confined to English. There are many other languages in which the singular has no overt mark while the plural does. It is also true that many languages have overt singular and plural indicators. However, there seems to be no language which marks the singular alone and not the plural. Once more, then, we have an implicational universal. The existence of an overt marker for the singular implies its existence for the plural. A second important consideration is that once more we have clusters of universals indicating the same hierarchy and some of the principles involved are similar to those found in phonology. As in phonology, the unmarked category has greater text frequency than the marked. A number of frequency studies show that the plural is less frequent than the singular, usually about 20 percent, compared to 80 percent for the singular. A further characteristic is that called neutralization. When number interacts with other categories, such as gender, the number of distinctions in the plural or marked member is never greater than in the singular or unmarked category and is frequently fewer. Thus, in German the three genders, masculine, feminine, and neuter, are distinguished in the singular but this distinction is neutralized in the plural. These are but a few of the characteristic relationships which are found to hold for all languages in regard to the distinction of singular and plural. Some of these are analogous to the marked-unmarked relationship in phonology and some are not.¹⁴ The third major consideration is that, as might be expected, the singular-plural relationship is not the only one to show these characteristics. For example, whenever there is grammatical expression of comparison in the adjective, the comparative and superlative are marked as against the positive. Such relationships also hold in certain semantic domains and, once again, can be couched in terms of linguistic universals. For example, in systems of kin designation the affinal (in-law) terms are marked as compared to the consanguineal terms.

Diachrony and Synchrony

The discussion thus far has been on a synchronic plane and is thus seriously incomplete.¹⁵ It may be pointed out that the study of universals promises to be an important factor in integrating the results of the two basic branches of scientific linguistics: the synchronic, which studies phenomena in terms of state abstracted from change; and the diachronic, which investigates the principles of linguistic change. The formulation of synchronic universals by specifying possible types of languages at the same time sets bounds on change, since change can be only from one possible type to another possible type of language. On the other hand every given synchronic state is the resultant of diachronic forces.

The concept of type discussed here provides one possible approach to the study of these interrelationships. It was noted earlier in this paper that there are a series of synchronic universals which point to a hierarchical relation between nasal and oral vowels in which oral vowels are the more fundamental class. We shall be concerned here with two specific synchronic universals in this area, the greater text frequency of oral vowels and the fact that no language is known to have more nasal than oral vowel phonemes.

The appropriate synchronic typology will evidently be one which languages are classified by two criteria: the presence or absence of nasal vowels and the presence or absence of oral vowels. There will then be four logically possible typological classes of languages: (i) oral and nasal vowels both present; (ii) oral vowels present but nasal vowels absent; (iii) nasal vowels present but oral vowels absent; and (iv) oral and nasal vowels both absent. Of the four classes just defined, as far as present knowledge goes, classes (iii) and (iv) are empty but (i) and (ii) exist and are exemplified by French and English, respectively.

We can ask, regarding any given set of typological classes generated by synchronic criteria, what potential diachronic relations exist for every pair of nonempty typological classes. In the present instance we can ask how a language of type (i) can become a language of type (ii) (loss of nasal vowels), or how a language of type (ii) can

become a language of type (i) (acquisition of nasal vowels). We shall be concerned here only with the second question.

The methodology required for the answering of such questions involves a kind of generalization of the historical-comparative method in the usual sense. We are to compare the results of specific studies of different language groups in which, in historically independent instances, languages which previously had only oral vowels acquired nasal vowels in the course of time. Such generalized historical investigations may be said to be concerned with process. In the present instance we are asking about the process by which languages acquire nasal vowels. Such theories may be called theories of relative rather than absolute origin, because they indicate the manner in which nasal vowels have arisen again and again at different times and places. Such theories may be considered a type of diachronic universal since they are of universal scope in regard to language, and since they refer to sequences of events which are of potential occurrence in languages of any chronological period or linguistic stock.

A comparison of different instances of the historical process of the acquisition of nasal vowels shows the following typical sequence of events.¹⁶ An oral vowel becomes nondistinctively nasalized when preceded by or followed by a nasal consonant, or both, usually, though not necessarily, in the same syllable. If the consonant is then lost, the contrast between nasality and orality in vowels becomes distinctive. This final stage is most frequently reached if the original nasal is syllabic final rather than syllabic initial and hence follows the vowel in the same syllable. We may symbolize this sequence of events as follows: $\underline{VN} > \tilde{\underline{VN}} > \tilde{\underline{V}}$ where \underline{V} stands for vowel, \underline{N} for nasal consonant, and the tilde symbolizes nasalization.

Apparently there are no instances in which the set of vowel monemes in nasal consonantal environments is greater than in non-nasal environments. Hence at the time that they arise they should not be more numerous than the oral vowels. The diachronic factors at work will tend to lessen the number of distinct nasal vowels as compared to oral vowels through the merging of nasal vowels with each other.¹⁷ More strongly put, we hypothesize the following implicational diachronic universal. The merger of a particular set of

nasal vowels always precedes that of the corresponding oral vowels, if the latter indeed occurs at all. There is thus a mechanism for decreasing the number of nasal vowels. To summarize, the synchronic universal that the number of nasal vowels is never greater than the number of oral vowels is deduced from two diachronic universals, the relative origin theory of nasal vowels and the preferential merger of nasal vowels, and one synchronic universal regarding the smaller or at most equal number of distinct vowels in a consonantal nasal environment as compared to the number of vowels in other environments.

Similar consideration will serve to explain the synchronic facts concerning the greater text frequency of oral vowels as compared to nasalized vowels. That the total frequency of vowels in nasal environments should be smaller than that in all other environments is highly plausible and indeed supported by empirical evidence. We must also assume that fluctuations over time due to obsolescence, new coinage, borrowing, analogy, and other processes exercise a basically random effect on this frequency relation once it is established.

We may apply this theory to Latin and French. In Classical Latin, which is ancestral to French, the proportion of vowels followed by nasals in the same syllable is 14.7 percent, while the proportion of those not followed by nasals is 85.3 percent. The relative frequency of nasal and oral vowels in French is 16.3 and 83.7 percent, respectively.¹⁸

The foregoing example is meant to illustrate one of a number of possible methods by means of which the study of universals, approached through the concept of type, opens up broad perspectives for fruitful interaction between the synchronic structural and the diachronic historical approaches to language.

REFERENCE NOTES

¹C. Wissler, Man and Culture (Crowell, New York, 1923), pp. 73-98.

⁸For the case of two variables, the logical tautology $\sim (\sim p \cdot q) = q \rightarrow p$ provides a conversion formula from a negative statement to a positive implication. This may be paraphrased. If there is nothing which is q and p then anything which is q is also p . For one variable the positive statement is an unrestricted that is, nonimplicational, universal: $\sim (\sim p) = p$. For example, if there is no type of language without vowels, then all languages have vowels.

⁹The theory of marked features occurs already in the work of the Prague School. The classic exposition in phonology is N. Trubetsky, Grundzuege der Phonologie (Travaux du Cercle Linguistique de Prague, No. 7, Prague, 1939).

¹⁰It might be thought that the nonnasal articulation is more complex from the articulatory point of view in that it involves an upward movement of the velic, cutting off egress of air through the nasal cavity. However, it appears that articulatory speech movement should be considered a departure not from the position of the speech organs in nonspeech situations but in terms of a "position of phonation. Present evidence is that in preparation for phonation the nasal passage is automatically cut off by the raising of the velic, and hence it is the lowering of the velic for nasalization which is a departure from the "neutral" rest adjustment of the speech organs. On the neutral position, see N. Chomsky and M. Halle, The Sound Pattern of English (Harper & Row, New York, 1968), p. 300.

¹¹G. K. Zipf, Human Behavior and the Principle of Least Effort (Addison-Wesley Press, Cambridge, Mass., 1949).

¹²The concept of marking outside of phonology was first employed by R. Jakobson in "Zur Struktur des russischen Verbums," in Festschrift Mathesius (Cercle Linguistique de Prague, Prague, 1932), pp. 74-84.

¹³Orthographic -s and -es correspond to three phonemes or phoneme sequences in spoken English /s/, /z/, and /əz/, but the choice is predictable from the last sound of the singular.

¹⁴See J. H. Greenberg, Language Universals, with Special Reference to Feature Hierarchies (Mouton, The Hague, 1966) for a detailed treatment.

¹⁵For a fuller discussion of the interrelationship of diachronic and synchronic factors in relation to universals, see J. H. Greenberg, "Some Methods of Dynamic Comparison in Linguistics," in Substance and Structure of Language, J. Puhvel, Ed. (University of California Press, Berkeley, 1969).

¹⁶It should be noted that the statements here regarding the origin of nasal vowels are subject to the reservation expressed in C. A. Ferguson, "Assumptions about Nasals: A Sample Study in Phonological Universals," in Universals of Language, J. H. Greenberg, Ed. (M.I.T. Press, Cambridge, Mass., 1963), regarding the possible origin of a nasal vowel in Iroquoian by spontaneous nasalization.

¹⁷The greater tendency for nasal vowels to merge with each other than the corresponding oral vowels has a basis in their greater acoustic similarity. Nasal vowels have additional nasal formants whereas oral vowels have no such additional acoustic property. Further, the nasalized vowels have attenuated first and second formants as compared with the corresponding oral vowels, thus reducing the basis for acoustic distinctness of vowels of differing quality (for example, a versus i) in comparison with oral vowels.

¹⁸The figures for French are taken from A. Valdman, "Les statistiques de l'antériorité articulatoire du Français," in Le Français Moderne 27, 102 (1959), based on a sample of 12,144 vowels. Those for Latin derive from a personal count of the first 1,000 vowels of Cicero's Letters to Atticus, Book III, Letters 1, 3, 5, 7, and 9.

At various times linguistics has served as a model for other sciences, invariably other social sciences, rather than natural sciences. For example, during the nineteenth century, when linguistics was basically comparative and historical, there were a number of attempts to develop a comparative mythology, law, etc. in conscious imitation of the linguistics of the period. Similar utilizations of linguistics as a model have occurred since then, each based on the linguistics of the particular period. Thus, and most recently, the approach of generative grammar has received application in anthropology in the analysis of kinship terms, and it has likewise had a considerable impact on psychology and philosophy.

It is the purpose of this paper to discuss several of these episodes. What, in each case, did linguistics seem to promise, and what were the reasons for the degree of success and failure in each case? In the process of seeking sources to such questions, we incidentally raise fundamental issues regarding the nature of the divisions among the sciences, the degree of unity of their methods, their criteria of success and the factors leading to success or failure in accordance with such criteria.

The following comparisons may help us to visualize the range of problems with which we are concerned and may serve as a basis for the consideration of those instances in which linguistics has provided a model for other sciences.

Let us suppose that we have a certain domain covering a portion of the earth's surface and that this domain has certain apparently natural divisions delimited by geographical features. We will call each division a field. Each field has a group of workers

who, as a general rule, confine their labor to the field in question and are supposed to produce crops as the fruit of their labor. Each worker uses whatever method he wishes, although there seems to be only a limited variety of such methods, so that many workers use essentially the same methods. There is a tendency for workers in the same field to share the same methods and for them to differ somewhat from those of closely neighboring fields. Moreover, there are recognizable similarities which recur in the methods used everywhere.

However, these fields, for some unknown reason, display vast differences in productivity: how can these differences be accounted for? Several explanations can be offered, some of which imply built-in remedies. These include the following. 1. There is an insufficient quantity of workers in the unproductive fields. Therefore, let us improve the yield of the more unproductive field by increasing the number of workers. 2. The fault is rather in the quality than the quantity of the labor force. For some reason, certain fields attract the best workers. Perhaps the better wage scales, or even the very fact that they have been more fruitful in the past will attract the better workers, those who seek the satisfaction that comes with successful effort. These first two diagnoses tend to coincide in regard to remedies. Let us increase both the quantity and quality of the workers in the more unproductive fields by additional incentives. 3. Perhaps the fault lies not so much with the nature of the labor force as with the methods they are using. All fields should use the methods employed in the most successful ones. This explanation is not as different from the previous one as might appear at first blush. If the workers in the unproductive fields were more intelligent, they would have acquired and utilized the methods which have proved most efficient elsewhere. This is a widely held view. In practice, since it is by and large the natural sciences which have had the greatest success, their methods are advocated for the less productive ones, e.g. the social sciences and the humanities. On this analysis, the methodology of all sciences should be essentially the same and is best exemplified by the natural sciences. This is sometimes called Scientism. 4. The exact opposite of the foregoing hypothesis is the true one. Every field has its own unique

best method. However, by luck or brains some have discovered their best method and others have not. The only directive suggested by this analysis is, so to speak, to keep plugging. Some day some of the poorer fields will discover their own methods and thus strike it rich. Let us, however, be on the alert for the signs of such a "break-through" and throw in our resources at the crucial moment. This is sometimes called the "cutting edge" philosophy. 5. Finally, in a still more discouraging vein, it may occur to us that the fault lies neither in the capacity of the laborers or in the methods they employ, but in the nature of the fields themselves. Some are simply inherently more productive than others. The appropriate response if we accept this explanation is simply resignation. There is nothing we can do about it. 6. Most drastically of all, perhaps, the divisions which we assumed as natural to begin with are not really so. What we considered to be unitary fields are actually heterogeneous, hence any attempt to look for a set of methods to apply to such an artificially determined entity is foredoomed to failure.

The tendency to use another field as a model stems from the third of the above explanations which might be restated in terms of our overall metaphor as, "the grass is greener on the other side of the fence." As was noted in our discussion of this alternative, in practice it boils down to imitation of the natural sciences. It can be shown that whenever linguistics, which on the basis of its subject matter is a social science, served as model, invariably for some other social science or humanistic discipline, it was because it exhibited in its methods and results the characteristics of some particular natural science or, we should add, of the mathematical logical pursuits which are, strictly speaking, not empirical sciences, but enjoy a comparable prestige both through their own achievements and via the use of mathematical methods in the natural sciences.

We may say, then, that comparative historical linguistics in the nineteenth century was imitated because it seemed to be successful like evolutionary biology. During the period of structural linguistics, roughly speaking 1930-1960, linguistics was imitated because it seemed to be successful like chemistry in its isolation of fundamental units. In the recent period, with the advent of generative

grammar, linguistics has appeared to be successful after the manner of logic and mathematics in that the grammatical sentences of a language are generated from a set of abstract entities designated by symbols through a set of rules for their formal manipulation.

Finally, in the investigation of universals both within the developing trend of generative grammar and in other approaches, linguistics seems to be gaining another kind of success which might be compared to that of physics, namely the attainment of a set of invariant relations, i. e. laws, something which has commonly been regarded as the ultimate goal of all the sciences. However, as we shall see, unlike physics, these laws are not in general quantitative.

In discussing each of these cases, we will attempt to analyze the extent to which a real analogy between linguistics and the particular non-behavioral science exists, the extent to which applications in other fields really followed the linguistic model to which supposedly adhered and what characteristics of language itself inhibited or facilitated its employment as a model in each particular instance.

The first example which has been mentioned is that of nineteenth century linguistics. During this period it furnished the basic model of a science which by the use of a comparative method obtained significant historical results. It is possible to distinguish three ways in which comparative linguistics was successful and thus provided a model for imitation by other disciplines.

The first of these is the explanation of degrees of similarity and differences among languages by a dynamic process of change. Such an approach, already well established by 1820, involves the rejection of the traditional static or creationist view in favor of an evolutionary approach. If, for example, a number of languages, A, B, C, etc., show far-reaching similarities not shared with another group of languages D, E, F, etc., the creationist theory would simply assert that such differential similarities had existed from the beginning without essential change and that the existence of natural groupings reflected the ground plan of creation. The

evolutionary explanation is that A, B, C, etc., had only differentiated in course of time, and that at an earlier period there was a single ancestral language, A', from which they had evolved by differential changes. Similarly, D, E, F, etc., had descended from a different ancestor, D'. Further similarities and differences of still more extended groupings would be explained by the postulation of still earlier remote ancestors and still earlier differentiations. If, for example, both A, B, C, etc., and D, E, F, etc., share common features as against some further grouping G, H, I, etc., this was explained by assuming a remoter ancestor A', which later differentiated into the more recent ancestral languages A' and D'.

The second achievement was that as a by-product of this kind of explanation, many peculiarities of existing languages could be explained historically as arising out of features of the common ancestral language by a process of change. For example, the vowel variations of English sing, sang, sung, and variation in other verbs involving at present different vowels could be explained as arising from an earlier, more regular system arrived at comparatively by analyzing similar variations in other related languages going back to the same ancestral Proto-Indo-European system.

The third aspect was that by this process of comparison it was possible to reconstruct in many details of the hypothesized ancestral language. Indeed, as early as the 1860s, Schleicher even ventured to construct a folktale in Proto-Indo-European.

The resemblance of all this to evolutionary biology should be evident. In Darwinian theory differential resemblances among species are explained by a process of change from different common ancestral species, now extinct. Similarly, specific peculiarities of species are explained historically as changed forms of the earlier ancestral structures which gave rise to them. Thirdly, and once more in a manner parallel to that of comparative linguistics, the characteristics of such ancestral forms are to a great extent inferred by comparison of later forms and are often actually found in the fossil record.

The acceptance of evolutionary explanations preceded that in biology by about half a century. The same August Schleicher first mentioned as the author of a fable in Proto-Indo-European was well aware of the resemblance and in 1873 he spelled out the comparison in detail in a work entitled *Darwinism and linguistic science*, while another prominent linguist of the period, Max Mueller, stated that "in matters of language, I was a Darwinian before Darwin."

While linguistic comparison led to the classification of languages into linguistic stocks on a worldwide basis, one particular instance, already alluded to several times, was of central significance: namely, Indo-European. The achievement of comparative linguistics in demonstrating that most of the languages of Europe were related to those of a large section of Asia extending from Armenia through northern India including, in particular, Sanskrit, the language of the sacred books of Hinduism, and its further success in penetrating into the abyss of prehistory and reconstructing the very words and grammatical structure of the ancestral Indo-European language, aroused the historical imagination of educated men in the nineteenth century. Applications of the methods of comparative linguistics to other fields followed, notably mythology, religion and law.

It might have been thought that this would be accomplished by grouping bodies of myth, religious beliefs or whatever else was being investigated into families of related traditions and then proceeding to comparison and reconstruction. Such a mode of application may be called formal in that the methods of the field to be imitated are transposed into new materials while retaining their original form. In fact, this was not done. The methods employed were in far greater direct dependence on the actual data and results of comparative linguistics. The method to be discussed may therefore be called a material imitation.

One reasoned as follows. If, to take the example of Indo-European, there existed an Indo-European language, then there was a population which spoke it and which had other non-linguistic institutions — political, religious, etc. These other institutions

must have developed from their original form to those of the contemporary people just as the language had.

Indeed, linguistic reconstruction itself gave some information about the terminology involved in these other institutions. Just as one could reconstruct a root **dent* 'tooth,' so one could reconstruct **dyēus* (cf. Greek Zeus) for the name of the sky god. Hence, it was thought, by comparing the religious beliefs and the myths concerning this divinity, one would arrive at the original set of beliefs and myths, just as one could reconstruct the sounds that made up his name.

Another example is law. "The eminent jurist, Sir Henry Maine, sought to construct the original legal institutions of the Indo-European peoples by the comparative method. It was no accident that his work was largely based on his own experience in India, the home of Sanskrit, that language whose discovery by Europe served as midwife to the birth of comparative linguistics. Maine, in his work of 1872, Village-Communities in the East and West, states explicitly that he is constructing a comparative jurisprudence after the model of comparative philology.

He remarks, however (p. 8): "I should, however, be making very idle pretension if I held a prospect of obtaining, by the application of the Comparative Method to jurisprudence, any results which in point of interest or trustworthiness are to be placed on a level with those which, for example, have been accomplished in Comparative Philology. To give only one reason, the phenomena of human society, laws and legal ideas, opinions and usages are vastly more affected by external circumstances than language. They are more at the mercy of individual volition and consequently much more subject to change effected deliberately from without."

Here Maine has, with uncanny accuracy, put his finger on some of the main factors which make language a uniquely favorable area of human behavior for the discovery of historical relationships. Language is relatively impervious to external environment and planned changes. Even drastic changes in other institutions will affect only a marginal portion of the vocabulary

and barely, if at all, its grammatical structure. Language contains literally thousands of lexical and grammatical forms, each constituted by an essentially arbitrary pairing between sound and meaning. Hence if there are widespread resemblances in those forms in one group of languages as against another, the explanation must be historical rather than functional. This is the celebrated principle of the arbitrariness of the linguistic sign whose classic statement is that by Ferdinand de Saussure, the great Swiss pioneer of structural linguistics. No other body of human custom has this characteristic to anything like the same extent. Hence, outside of language, only more limited and less certain results are possible, as Sir Henry Maine so clearly saw.

The historical emphasis of the nineteenth century, while surviving and retaining considerable importance, nevertheless has largely given way in the twentieth century to an interest in the understanding of language in terms of its internal structure rather than as a product of historical evolution. The general trend, because of the strategic role of the concept of structure, is generally known as structuralism. It was far from being a unified movement consisting as it did of various schools and independent researchers in Europe and the United States. Roughly speaking, by 1930, this movement had come to dominate scientific linguistics. Its great success was the development of rigorous, or what at the time seemed to be rigorous, techniques for the description of language. In its earlier period, the topic of theoretical concentration was the study of the phonological or sound systems of languages. It developed general methods by which the sound systems of any language could be analyzed as made up of a very limited number of basic entities, e.g. 30 or 40 so-called phonemes. It is out of sequences of these, in themselves meaningless elements, that the thousands of meaningful units, e.g. words, of a language are formed. Later, the same basic mode of analysis was extended to the grammatical level. Here also it seemed that there was a basic unit, which was called the morpheme, and which was in general smaller than the word. For example, un-child-like could be analyzed as consisting of three morphemes. On both these levels, the phonological and grammatical, it was believed that a language could be exhaustively described by the isolation of fundamental

units and the laws of their combination. This model was most fully developed in American structuralism.

It does not seem far-fetched to compare this kind of analysis with that of chemistry. Just as the myriad objects of the natural world could be analyzed as consisting of various combinations of a limited number of fundamental chemical elements, so the infinity of sentences of a natural language could be described as made up of combinations of a large but finite number of morphemes, and these in turn by a very restricted number of phonemes.

We derive some notion of how impressive such achievements might seem to non-linguists from the truly ecstatic remarks of the eminent French anthropologist, Claude Lévi-Strauss, delivered at a large international meeting of anthropologists organized by the Wenner-Gren foundation in New York in 1952. Lévi-Strauss here compares the rise of structuralism in linguistics in its significance for the human sciences to that of the Newtonian revolution for the physical sciences. "Linguists have already told us that inside our mind there are phonemes and morphemes revolving one around the other in more or less the same way as planets around the solar system."

Much as a century earlier, there were now uses of linguistics as a model for other fields, which can once more be distinguished as material or formal. In the first type, the material, the language of the science itself is analyzed. Fostered in some instances by the successes of linguistics, but in other cases apparently as independent instances of the same trend, many in the 1940s and 1950s came to the belief that their respective fields might be advanced by the analysis of the language employed in the science itself. It thus became fashionable to speak of the language of the law. Two examples of this during the period under discussion are Kenneth Burke's A Grammar of Motives (1945) and Harold Lasswell's Language of Politics (1949). It cannot be really argued that in any of these attempts there was more than a superficial resemblance to the linguistics of the period. This was probably owing to the far greater specialization that existed as against a century earlier.

Thus, unlike in the more recent period, it was possible for Sir Henry Maine to have at least a broad acquaintance with a field as remote from his own as comparative philology.

In contrast to these material applications, the formal mode of imitation was quite seriously attempted in American anthropology, which has always been close to linguistics and indeed considers it to be a branch of cultural anthropology. At the same Wenner-Gren conference mentioned earlier, one of the topics proposed for discussion was "the cultural equivalent of the phoneme."

The promise held out by the linguistics of this period was that by the application of an analogous method to the data of non-linguistic culture, functionally relevant units of description might be isolated in terms of which the culture as a whole could be described. This seemed highly desirable because it was widely held that the cultural anthropologist had no principled basis for choosing what to observe or how to analyze these observations once they were made.

A valiant attempt to develop methods for the application of structural linguistic methods to non-linguistic cultural data was that of the eminent American linguist Kenneth Pike in a series of stimulating volumes called Language in Relation to a Unified Theory of the Structure of Human Behavior. Judged, however, by the test of application, this attempt must be judged a failure. I know of no instance in which a cultural anthropologist has been able to transpose with any real success linguistic methods into cultural materials on this model. Pike's attempt has, however, bequeathed to the language of anthropological theory the widely used terms *emic* and *etic*. These words are abstracted from phonemic and phonetic respectively, and herein lies the heart of the matter. For the hope implicit in the application of these methods was that just as the linguist distinguishes mere physical (i. e. phonetic) non-functional variation from functionally relevant phonemic variation, so the cultural anthropologist might, for example, by observation of the variant renditions of a religious ceremony, abstract those which were merely *etic*, or culturally irrelevant, from those which were *emic*, or functional. Otherwise put, the criterion of functional

relevance leads us to analyze a phonetic universe which is continuous into discrete contrasting units.

Once again, one of the characteristics of language not shared by other aspects of cultural behavior obtrudes itself. Language is basically a code by the use of which we frame messages which have a meaning in a quite definite way. The linguist's method in phonemic analysis was essentially to call a difference between sounds phonemic if it had the systematic function of distinguishing messages from each other as against those differences which did not. But a religious ceremony, while in a very broad sense meaningful, does not send messages, as it were, with such precision that we can say when the message is the same or different. Or again, for all its esthetic glories, the storm in the third movement of Beethoven's pastoral symphony cannot substitute for a meteorological report.

We may mention in passing two other aspects of structural linguistics which circumscribed its usefulness in application to the cultural realm. This particular theory of linguistics, since it was strictly synchronic, that is, described linguistic structures in a single time frame, was not equipped to handle cultural change. Further, being non-quantitative, it would, when applied to fields like economic behavior, substitute an analysis of the behavior of buyers and sellers in a market situation for statistical studies of economic processes. This limitation, more inherent in linguistics than its confinement to static description, will be examined in connection with a later topic of this paper.

One should not leave this aspect of linguistics as a model without some further mention of Claude Lévi-Strauss, for he has, in a way quite distinct from the Pikean model, been deeply influenced by a more European form of structural linguistics which emphasizes abstract oppositions. For him, it is one of the strands of a highly sophisticated approach which has been at once broadly influential and highly controversial. It is not within the necessarily limited scope of this paper to discuss the theoretical aspects of these contributions of Lévi-Strauss.

The last decade has seen, under the leadership of Noam Chomsky, the rise to a commanding position in American, and indeed in world linguistics, of a new approach to linguistics: that of generative grammar. It should be noted that this viewpoint in linguistics is clearly related to a broader movement which involves a reaction both against the logical positivism which had dominated American philosophy in the previous period and against behaviorism, which held a similar position in American psychology and philosophically had close ties with positivism. Although in the form of generative grammatical theory it is clearly a theory which deals with language as such, broadly considered it is another instance of the influence of one field on another, for two developments within philosophy, in particular, are part of the essential background of this movement. The first of these is the currency of certain critiques of positivistic accounts of natural science theory, particularly that of physics, and the second is the formalization of logic and of the foundations of mathematics.

With reference to the former through the analysis of Toulmin, Harré and others, it became clear that actual practice in the model science physics did not conform to the models regarding theory construction advanced by positivistic philosophers of science. Theoretical concepts and laws were not constructed directly out of and defined by reference to observables. Although there is a necessary ultimate confrontation with empirical observations, the theories themselves were not arrived at by simple generalizations from observed facts. These were constructed much more freely and imaginatively and their connection with observations was highly complex and indirect.

Now particularly the brand of structural linguistics practiced by American linguists did in fact emphasize a kind of rigorous descriptive procedure based quite directly on observables. In this respect, and in its rejection of mentalism, it was widely viewed as solidary with the behaviorism which ruled American psychology during the same period.

While these developments in the philosophy of science

provided the motives for the re-examination of basic assumptions of American descriptive linguistics, it was the much older developments in the formalization of logic and mathematics which became the fountainhead for the actual techniques employed in the new approach. A generative grammar resembles such formalizations in an essential way. There are certain initial symbols or sequences of symbols corresponding to the primitive terms and axioms of formalized systems and certain explicitly formulated rules for transforming them. These operations are purely formal in that the semantic interpretations of the symbols do not figure in determining the application of the rules. Ultimately the terminal symbols generated by these procedures do receive empirical linguistic interpretation, phonetic or semantic.

This approach involves not merely technical differences from the older theory, but a different conception of language. Language becomes not so much a set of actual sentences as an internalized mechanism of rules for producing sentences. When a language is learned it is this mechanism which is learned. The sentences of a language are a theoretic infinity produced by this finite mechanism. It is clear that the acceptance of this view regarding the nature of language, incompatible as it is with behaviorism, has profound implications for psychology, and has indeed already had a significant impact on that science. In terms of our analysis, this is a material rather than formal influence. Given that psychology must deal with human language as a psychological mechanism, a change in the conception of that mechanism entails changes in the psychological analysis of that mechanism.

Another influence has been in anthropology, a field always sensitive in the recent period to developments in linguistics, the most concrete effect has been in the study of kinship terminology, which had earlier been subject to formalized treatment. The work of Lounsbury, Hammel, and others has translated this into a generative treatment in that from certain fundamental terms of a system, others are produced by a formal application of rules. In a sense this is an application of generative theory to language itself, since kinship terms are part of the lexicon of a language. It may be called formal, however, in that the methods of generative grammar

are transposed into a new field. This may seem odd, but it rests on the fact that the lexicon in standard generative theory has not itself been treated generatively, but rather as an unordered set of items. Dissatisfaction with this situation has led to various attempts at the production of a so-called generative semantics.

Finally, both within and outside of generative theory in the last decade there has been an increasing interest in the universal features of language. Any linguistic theory must be able in principle to deal with all languages and insofar as this is possible there must be significant properties common to all the world's languages which make this possible. But one aspect of this many-faceted problem can be dealt with here. Although there are very few factual statements about all the languages of the world which are unconditionally true (e.g. statements of the type all languages have vowels), there are many which take a conditional form and can therefore be stated in the form of a logical implication (e.g. if a language has nasalized vowels it always has oral [i.e. non-nasalized] vowels, but not necessarily vice versa). More than any other linguist, Roman Jakobson has pioneered in showing the extensiveness and the theoretical significance of such lawlike relationships. Essentially, what they reveal is an ordered and to a great extent generalizable hierarchy of human preferences as revealed in human language. They involve a hierarchy, since it can be said that the implied is being favored, since the other member cannot be found in its absence, while the opposite relation does not hold. Thus, in the earlier example, oral vowels are favored over nasal vowels since nasal cannot occur unless oral vowels are present, but oral vowels can occur even in the absence of nasal vowels. Such hierarchies show a degree of generalizability in that certain broad common features are found to apply in large numbers of cases. One example is in phonology, where in general the disfavored sound is more complex in that it involves additional movements of the articulatory organs. This additional articulation is called the mark, and hence the disfavored articulation is called marked as against the unmarked, favored articulation. This theory of marking originally developed in the Prague school of structuralism and was soon extended to grammatical relations. Thus, at the present time the theory of marking has become a central theoretical concept, and is applied in general to

hierarchical preferences in any aspect of language, whether a mark is literally present or not.

Marking is by no means the only type of linguistic principle involved in universals. The emergence of it and other general principles seems to be leading to a body of interrelated generalizations which might be compared to laws in physics. They are not, however, in general quantitative. This does not prevent them from being mathematical in the sense that all formal relationships are essentially mathematical, even when they are not quantitative. The old definition of mathematics as the science of quantity is of course long out of date and many branches of mathematics, e.g. topology, group theory, are not quantitative. Hence the Galilean vision of mathematics as the language of science is still valid, but involves a broader conception of mathematics.

What, then, of our original questions regarding the degree of distinctiveness of methodology in different scientific fields in the light of the foregoing reflections based on several instances of the employment of linguistics as a model in other fields. The main principle which seems to emerge may be summarized as follows. Such attempts have in general not succeeded, because language as a subject matter possesses certain peculiarities such as the arbitrariness of the relation between form and meaning, the existence of large numbers of basically independent form-meaning items, and its nature as a basic code in accordance with which an infinity of messages with fairly specific and well defined meanings is possible. Yet in every instance there is a general principle involved. For example, in regard to any subject matter, it will be favorable ground for inferring historical connections to the degree which the connection between form and function is arbitrary. In linguistics, this relationship holds to a marked extent, whereas in certain other fields in which attempts at discovering historical relationships have been made, the results have been less successful, because the relationship between form and meaning is far less arbitrary than in linguistics. Different fields, then, differ in the extent to which certain characteristics do or do not obtain. Hence, even though the investigation of all such characteristics involves general principles they will, in practice, be applicable to a lesser

or greater degree to different subject matters. Linguistics seems to be peculiarly rich in possessing to a high degree a number of characteristics which provide grounds for varied types of success.

NOTE

This is a paper presented at the Smithsonian Institution, Washington, D. C., on November 12, 1970, as part of a symposium "Linguistics in the 1970's" sponsored by the Linguistic Society of America, the Center for Applied Linguistics, and the Smithsonian Institution.

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The comparison of language to a chess game figures prominently in the Cours de Linguistique Générale (Course in General Linguistics) of Ferdinand de Saussure. Professor of Historical and Comparative Indo-European Linguistics at Geneva from 1896 to 1913. By general consent, DeSaussure is the major pioneer of modern structural linguistics, one whose direct and indirect influence on the development of linguistic studies has been immense. The French linguist, Benveniste, summed up this influence aptly in a paper given at the University of Geneva on the fiftieth anniversary of DeSaussure's death, in which he stated that "There is not a contemporary linguist who does not owe him something. There is not a general theory which does not cite him." Moreover, he has exercised an ever widening influence outside of the bounds of linguistics proper. Every social scientist who uses the terms synchronic and diachronic owes him a debt whether he realizes it or not, for it was DeSaussure who introduced these terms.

In the present paper¹ there will be two factors, perhaps hopelessly intertwined, yet necessary to distinguish. The one is a critical consideration of what the historical DeSaussure actually said, and the other is a purely abstract consideration of ideas and their validity. It is particularly necessary to make this distinction in the case of DeSaussure because the problems of exegesis of his thought are especially difficult and have given rise to a considerable critical literature. This is no doubt normal in the case of any figure of major significance, but in DeSaussure's case the difficulties are of a special nature because of the form in which his doctrine has come down to us. For his great influence has almost all been posthumous and the result

of a single book, Course in General Linguistics, a book which in fact he never wrote. During the latter part of his life at Geneva, he gave a course in general linguistics to a small number of students on three occasions: In 1906-7, 1908-9, and 1910-11.² This course made such an impression that two of his students, celebrated linguists in their own right, Albert Sechehaye and Charles Bally, from the notebooks of a number of pupils who had taken the course, in 1916, three years after his death, jointly produced the book with which his name will always be associated. In carrying out this task, however, they conceived of it as one of welding the materials at their disposal into a single coherent doctrine. We now know that they freely interpolated wording of their own where they felt it to be necessary. We know this in some detail, because Robert Godel, another prominent member of the so-called Geneva School, which most clearly seeks to perpetuate the DeSaussure heritage, published in 1957 a volume called Sources manuscrites du Cours de linguistique générale de Ferdinand de Saussure, in which numerous passages in the Cours as we have it are confronted with the relevant passages in the unpublished student notebooks. A complete initial edition of the Cours by Rudolf Engler is in preparation and began to appear in 1967 (Weisbaden) but the fourth and presumably final fascicle has apparently not yet appeared. This work should provide a basis for a fuller study of the relationship between the Cours and the original sources than has hitherto been possible.

Under these rather special circumstances, it is obviously not always easy to say what DeSaussure really thought on a number of basic issues. Moreover, it is clear that he himself had not yet worked out a completely articulated doctrine. Hence, when in this paper some idea is attributed to DeSaussure, this background should be kept in mind. All I would claim is that I am following the preponderance of evidence, and that in the present context what the historical DeSaussure thought, in itself an important question, is not the central issue.

One other preliminary remark is in order. A good many of the expository and critical observations made here are far from novel and may be encountered in the by now extensive literature on the Cours.³ The form of an oral lecture does not lend itself to detailed documentation. Those acquainted with this literature will recognize its influence

at many points and with it the extent of my intellectual debt to earlier discussions of these topics.

In the Cours as we have it, there are three passages, amounting in all to about four pages, in which a number of assertions about language which constitute much of the theoretical core of DeSaussure's doctrine are set forth through the comparison of language to a chess game. One is tempted to say in the more contemporary terminology of models, that chess furnished a model for some of the central conceptions of DeSaussure's theory of language. The ordinary language ancestry of such uses of models would seem to be the metaphor (or more accurately the simile). For example, Richard Harré, in his book Theories and Things (1961) talks of "the weakest of all forms of theory —the use of metaphors."

In reference to DeSaussure, one would hardly say that he had a theory that language was like a chess game. Yet it was more than just a metaphor. He says at one point (p. 88),⁴ "But of all comparisons that might be imagined, the most fruitful is the one that might be drawn between the functioning of language and a game of chess A game is like the artificial realization of what language offers in a natural form." This kind of in-between status of the chess simile would seem to be something whose exact theoretic status is deserving of a further and more technical investigation which is not attempted here. However, some of its characteristics will appear in the course of this paper.

DeSaussure was instrumental in bringing about a basic change in the way linguists approached the study of language. This shift in how language was to be conceived may be summarized in the following terms. It was no longer to be viewed exclusively or even primarily as a product of historical evolution, but rather as a coherent structure to be studied synchronically, that is, as it exists at a single time and in abstraction from change. To use the terminology employed by linguists, the comparative and historical approach was succeeded by structuralism in its various forms as the predominant way of scientifically investigating language. This development was not, of course, confined to linguistics. An analogous and presumably not unconnected change was going on in general sociocultural theory and if we had to choose one person as the essential pioneer here it would

be another French-speaking scientist, Émile Durkheim, an almost exact contemporary of DeSaussure. (He was born one year earlier and died four years later). The similarities, differences, and interrelationships of Durkheim's and DeSaussure's thought are themselves a fascinating topic which cannot be pursued here. In both cases, however, what might be called the French epistemological tradition exercised a decisive and largely parallel influence on the specific form in which their theories were enunciated, and in both cases the new viewpoints took on in some respect rather drastically different forms outside of the French-speaking world. This process, which stands in need of closer study, has of course not gone unnoticed. For example, Scholte has written an article in the American Anthropologist which is chiefly oriented towards an understanding of Lévi-Strauss' theoretical approach and is entitled "Epistemic paradigms: some problems in cross-cultural research in social anthropological history and theory" (AA 1966, pp. 1192-1201.) It takes note of the differences which, broadly speaking, distinguish the French rationalist from the Anglo-American empiricist tradition. A basic aspect of this difference is, as he phrases it, the primacy of the human mind in the rationalist approach as against the primacy of the behavioral act in empiricism. One of the recurrent tendencies in French rationalist thought is a fairly obvious corollary of this emphasis on the mind, namely, analysis in terms of dichotomies stated in absolute terms. The empiricist is impressed with the raggedness and arbitrariness of boundaries in the real world, whereas in the world of concepts we can always provide definitions so that concepts are mutually exclusive. One can go back in the French tradition at least as far as Descartes' distinction of mind and body as two absolutely different substances. One encounters an echo of this type of thinking when one reads in DeSaussure that (p. 83) "The opposition between the two viewpoints, the synchronic and the diachronic, is absolute and allows of no compromise." One is also forcibly reminded of Durkheim's similarly absolute distinction between the sacred and the profane in his Elementary forms of the religious life.

In the present connection we may note that there are inherent in DeSaussure's metaphor of the chess game no less than three such dichotomies, although they are nowhere enumerated as such. These

are the distinctions between what is internal and external to language, in turn closely related to the opposition between language to speech, the contrast of synchrony and diachrony, and that of form and substance. Moreover, for each one of these distinctions the first member is clearly favored for one or another reason. Thus, regarding the synchronic and diachronic, DeSaussure observes (p. 50) "They are not of equal importance. Here it is evident that the synchronic view predominates."

One further preliminary remark is in order. In presenting just these points for convenience of discussion, a certain arbitrariness is inevitable, particularly inasmuch as there are intimate connections among them, both logically and psychologically. The doctrine is in a sense all of one piece and the aspects distinguished here are to a great extent, to use the French terminology, solidaire, solidary with each other.

The first point to be made—and in fact it involves the first use of the comparison to chess in the Cours as we have it—relates to the distinction between what DeSaussure calls internal and external linguistics. An essential motive for this is that he wishes to define the subject matter of linguistics. As he says (p. 20), "My definition of language presupposes the exclusion of everything that is outside its organism or system—in a word, of everything known as 'external linguistics.'" He then goes on to enumerate these externals. As first and most important, he mentions "all the points where linguistics borders on ethnology, all the relations that link the history of a language and the history of a race or civilization." As further externalities, he then adds the relations between language and political history, as well as language and various other social institutions (e.g. the Church, the schools). Finally, he says, "Everything that relates to the geographical spreading and dialectical splitting belongs to external linguistics." He notes that (p. 22) "The study of external linguistic phenomena is most fruitful: but to say that we cannot understand the internal linguistic organism without studying external phenomena is wrong." For example, a loan-word no longer counts as such when it is studied within a system. It exists only through the relationship within the system with other words just like an inherited

word. "In any case," he adds, in the typically dichotomous manner already noted, "separation of the two viewpoints is mandatory, and the more rigidly they are kept apart, the better it will be." He then resorts to chess to illustrate this distinction (p. 22): "In chess, what is external can be separated relatively easily from what is internal. The fact that the game passed from Persia to Europe is external; against that, everything having to do with its system and rules is internal. If I use ivory chessmen instead of wooden ones, the change has no effect on the system, but if I decrease or increase the number of chessmen, this change has a profound effect on the 'grammar' of the game. One must always distinguish what is internal from what is external."

In distinguishing what is external from what is internal, there is another distinction which might be subsumed under it. DeSaussure, however, treats it quite separately. This is another famous Saussurean dichotomy, that between language ('langue') and speech ('parole'). Like the external-internal dichotomy it also figures in the attempt to delimit the basic object of linguistic science. Briefly stated, langue is the system as such and parole is this system in actual use.⁵ He says (p. 14) "In separating language from speaking we are at the same time separating: (1) what is social from what is individual; and (2) what is essential from what is accessory and more or less accidental." Here, however, the relationship of what is external to the system, namely 'parole,' speech, is obviously more intimately related to linguistics as a science than such externalities as political history mentioned earlier. Hence he considers its study a kind of linguistics, "the linguistics of speaking" as against "the linguistics of language." However, very little is actually said about what it would consist of. Once more the separation is drastic. They are the subject matter of two different sciences. And once more there is no room for doubt as to where the interest of the linguist lies (pp. 15-20): "One might, if really necessary, apply the term linguistics to each of the two disciplines and speak of a linguistics of speaking (linguistique de la parole), but that science must not be confused with linguistics proper, whose sole object is language."

DeSaussure does not utilize the comparison of language with chess to illustrate the langue/ parole distinction. At one point he uses a different comparison, one which has been sometimes used in the recent literature, the relationship between a musical score and its performance (p. 18): "Language is comparable to a symphony in that what the symphony is stands completely apart from how it is performed; the mistakes that musicians make in playing the symphony do not compromise this fact."

Now DeSaussure might have used the chess comparison once again to contrast this time the rules of the game with the actual games played in accordance with them. In doing so, one would see clearly that the two kinds of externality are indeed different. In more recent years, with the vogue of information theory, language has often been compared with a code. One could once more distinguish the code itself, on the one hand from such externalities as where and by whom the code was compiled, and on the other hand from the body of messages for which the code is utilized.

Now let us turn to what happens in an actual game. The first point made by DeSaussure in the passage in which the comparison between language and chess receives its greatest elaboration is the following (p. 88): "First, a state of the set of chessmen corresponds closely to a state of language. The respective value of the pieces depends on their positions on the chessboard just as each linguistic term derives its value from its opposition to all the other terms." To rephrase DeSaussure in terms that have since become so familiar, a language at any given time has a structure in which all the elements are interrelated. It is by now apparent that functionalism and structuralism are not quite the same thing. In fact what holds them together is another influential metaphor, society as an organism in which anatomy corresponds to structure and physiology to function. In linguistics the term structure has been far more widely used than function and the whole movement of which DeSaussure has been hailed as the forerunner is normally called structuralism. However, DeSaussure himself only uses the term structure casually. In Benveniste's apt phrase, for DeSaussure structure is not a doctrinal word. This is perhaps also why the recent book by Mounin on DeSaussure in the series Philosophes

l'aujourd'hui bears the subtitle *Le Structuraliste sans le savoir*, that is, "the structuralist without knowing it." Of course, structuralism is now the going term in France, but there is a deeper reason for maintaining the aptness of this designation. DeSaussure, for whom the basic terms are "system" and "relation," conceives them basically in static terms rather than in accord with the more dynamic metaphor of functionalism which involves activity in a kind of fictionalized timeless state. At this point we begin to see some of the services performed by the chess comparison for DeSaussure. It enables him and those who read him to visualize how the state of something at a particular time can have an internal coherence and so form a stable object for scientific investigation. For this was a way of looking at language which was novel, and DeSaussure is, as it were, saying, "You find it hard to imagine how a language at one particular time, with all its obvious heterogeneity deriving from the accidents of historical development, can constitute some kind of unified and coherent system. Well, consider a position in a chess game. It shows how a set of simultaneously existing objects can form a systematic whole which can be analyzed. For we consider a position in chess to be just that" (closed quote to what DeSaussure might have said).

Now, the dominant historical comparative school of the time was, to use the term of opprobrium which became common in the polemics, of the subsequent period "atomistic" in that the historical development of each aspect of language was treated characteristically in isolation. To take one example, in the fundamental comparative work on the Romance languages by Wilhelm Meyer-Lübke, in four volumes (1890-1902) *Grammatik der romanischen Sprachen*, the first volume is devoted to phonology, the second to morphology, the third to syntax and the fourth is an index. In the first volume on phonology, there are separate sections on the vowels and consonants. In the section on the vowels, there is a subsection on each of the vowels of Vulgar Latin. For example, for no less than 45 pages, the fate of Vulgar Latin *a* is traced in all the Romance languages through time. In the whole course of this monumental work one never sees what the vowel system, much less even the entire sound system, of any Romance dialect, was at any particular time.

We can now see in retrospect as we look at DeSaussure's career, how, at the very beginning, his dissatisfaction with this situation arose. DeSaussure's published work during his lifetime was like that of the other leading linguists of the period, historical and comparative, and also, like almost all of them, it was concerned with the Indo-European languages. His career was indeed launched precociously and brilliantly when he gave a paper in Paris, at the age of 19, on the Proto-Indo-European vowel system, a paper which resulted in the monograph *Mémoire sur la système primitif des voyelles dans les langues indoeuropéens*, published two years later (1879). The very term *système* in the title is an indicator of the earliest directions of his thought. It would obviously not be in place here to discuss this remarkable work in detail, but we can consider certain relevant aspects of it. He notes at the very beginning that it was his original purpose to discuss the various vowels of the Indo-European languages which during that period were considered to be varieties of an original a but that it proved impossible to do this without considering all the vowels as a system and the place of a within it. The following example will show how this occurred in actual practice. In Indo-European languages there is a system of vowel alternation traditionally called *Ablaut*, by which vowels in certain grammatical forms alternated with other vowels in other grammatical forms. This system still survives in modern English in such vowel variations as that shown in *sing* 'present,' *sang*, 'past,' *sung*, 'past participle.' Now, in the earliest forms of this system, as we find it for example in Classical Greek, it has as a basic feature that e alternates with o in certain specifiable grammatical categories. For example, in the present of the verb 'to speak,' we have e in the root, e.g. *légō*, 'speak,' whereas we find o in the related noun *lógos*, 'word,' 'discourse.' However, there were instances of o which did not alternate with e, but remained constant. DeSaussure, even though this vowel was phonetically not distinguished from the alternating o in any language, considered it a different unit, or phoneme, as he called it in a pioneer usage of the term. Hence, two things which were physically the same were to be considered fundamentally distinct units because one participated in a relationship which the other did not.

It is clear that DeSaussure never forgot this and similar lessons, and must have meditated for long on their significance. The Mémoire itself remained famous but uninfluential during his lifetime. He suffered the frequent fate of a man ahead of his time, and during his Geneva period, he all but ceased to publish. His dissatisfaction with current linguistics grew, but he was never completely satisfied with his own theories. A letter to the famous Indo-Europeanist, Antoine Meillet, during this period, is very revealing. Meillet had been his student and was deeply affected by his view of language as essentially social, but in his concrete work in Indo-European, he ignored DeSaussure's results. In a letter dated January 4, 1894, DeSaussure says, "This will finish, in spite of me, with a book in which, without enthusiasm or emotion, I will explain why there is not a single term employed in linguistics to which I attribute any meaning."

As a postscript to all this, it should be noted that DeSaussure's views on the Indo-European vowel system received brilliant posthumous vindication. In order to explain the Proto-Indo-European system as a systematic unity, he felt compelled to posit the existence of elements not found at the time in any existing language, elements whose phonetic nature he does not feel he can specify, but whose place in the system can be specified and with it, the specific linguistic forms in which it should occur. Hittite was later discovered through archaeological investigations, and was found to be an Indo-European language. It became apparent, moreover, as pointed out by Kurylowicz in 1927, that one of the sounds posited by DeSaussure actually occurred in Hittite as the consonant h .⁶ The spin-off of this discovery has led to the development of what is, no doubt, the most active area of contemporary Indo-European phonological studies, laryngeal theory.

But let us return once more to our chess game. It was inherent in what DeSaussure was asserting about language being a system that this system existed at a particular time, or in the terms introduced by DeSaussure himself was synchronic rather than diachronic. But how was change to be conceived? Here once more the comparison with chess provided an apt illustration. A language

in its change through time was to be conceived as a succession of states. The process of change is like a move on the chessboard which produced a new position in place of the old one (p. 14): "In chess each move is absolutely distinct from the preceding and the subsequent equilibrium. The change effected belongs to neither state. Only states matter."

Although not put in these precise terms by DeSaussure, one might say that change is here defined as a relation between an earlier and a later state. On this view, it makes no sense to ask in what the process of change as an ongoing thing consists. As well ask whether, when a knight moves on the board from one space to another it passes over one particular square rather than another; whether, let us say, it moves one straight forward plus one diagonal forward as against one diagonal forward followed by one straight forward.

There seems, then, to be a logical priority of the synchronic as compared to the diachronic in that the diachronic relationship is defined as a relation between states. This is what is implied further in the statement, "Only states matter." Moreover, previous history is not necessary to the understanding of a specific state.

In illustrating the independence of synchronic state from the diachronic process that produces it, DeSaussure again uses the chess game as an illustration, this time with the most telling effect of all (p. 19): "In a game of chess any particular position has the unique characteristic of being freed from all antecedent positions; the route used in arriving there makes absolutely no difference; one who has followed the entire match has no advantage over the curious party who comes up at a critical moment to inspect the state of the game; to describe this arrangement it is perfectly useless to recall what had happened just a few minutes previously."

I can still recall the almost electric effect of this passage on me when I read it as a graduate student. Here we see how a metaphor can be something analogous to those proofs in mathematics

in which the mutual consistency of a set of postulates is proved by constructing an actual system which embodies them. The great majority of DeSaussure's contemporaries simply could not conceive of any other type of explanation in linguistics than the historical. For example, the very title of Herman Paul's work, which more than any other summarized the views of the dominant comparative historical school of the time, embodies this assumption, namely, Prinzipien der Sprachgeschichte, "principles of linguistic history." It was first published in 1880. In the second edition (p. 20 of the English translation), we read: "The objection has been raised that the historical approach to language is not the only scientific method available for the study of language. I am forced to deny this." The objection had been raised by Franz Misteli, in a review of the first edition of Paul's book in the Zeitschrift fuer Voelkerpsychologie und Sprachwissenschaft, in which it was urged that the study of language should not be confined to the historic approach. Misteli was one of the very few champions, at this late date, of the typological approach, which proclaimed that languages might be legitimately compared in terms of type similarities and differences, even if they were not historically related. However, Misteli gives no clear indication of how such comparisons can really be fruitful, and it is clear that his viewpoint is very different from that espoused by DeSaussure.

We have just seen that synchronic states can be explained without any reference to their history. But the synchronic viewpoint is not merely equal and independent of the diachronic: it is in an important and profound sense superior (p. 90) "...they are not of equal importance. Here it is evident that the synchronic viewpoint predominates, for it is the true and only reality to the community of speakers." Or again (p. 81) "The first thing that strikes us when we study the facts of language is that their succession in time does not exist insofar as the speaker is concerned. He is confronted with a state. That is why the linguist who wants to understand a state must discard all knowledge of everything that produced it and ignore diachrony. He can enter the mind of speakers only by completely suppressing the past. The intervention of history can only falsify his judgement." Here indeed we are at the heart of the

revolution in conceptions which was taking place in linguistics and elsewhere. We are now to look at human behavior in terms of internal psychological reality rather than externally. And this revolution is still very much with us.

One further celebrated Saussurean dichotomy remains to be considered, once more strikingly illustrated by the comparison with chess: that of form and substance. The system is constituted by certain relations. Or, as he says at one point, "In language there are only relations." The physical form taken by the elements which participate in the relationship is irrelevant. This is expressed once more in terms of chess as follows (pp. 22-23): "If I use ivory chessmen instead of wooden ones, the change has no effect on the system; but if I decrease or increase the number of chessmen, this change has profound effect on the 'grammar' of the game." Elsewhere, he states: "Suppose that a piece happens to be destroyed or lost during the game. Can it be replaced by an equivalent piece? Certainly. Not only another knight, but even a figure shorn of every resemblance to a knight, can be declared identical, provided the same value is attributed to it." Regarding this, the Dutch linguist, Reichling, added the obvious proviso that it could be anything else except some other piece, e.g., a pawn.⁷

Of course, language cannot exist without substance, but the specific substance does not matter, just as long as each element is distinct from every other. In morphology, it can even occur that a particular category is expressed precisely by the absence of any sound at all. For example, in a large group of Czech nouns, the genitive plural has no ending (p. 86): "We see then that a material sign is not necessary for the expression of an idea; the language is satisfied with the opposition between something and nothing. Czech speakers recognize žen as a genitive plural simply because it is neither žena nor ženu nor any of the other forms." Before leaving this topic it should be pointed out that some have maintained that DeSaussure did not really mean to abstract from specific substance and some passages could, in fact, be quoted in favor of this view. The predominance of the evidence is, however, I believe, for the view presented here.

Thus far, I have been attempting to present the comparison of language to a chess game as we find it in DeSaussure in an uncritical, even, I trust, a sympathetic fashion. We now turn to a more critical evaluation. But we must first ask what it is to criticize a metaphor. A metaphor is not true or false like an assertion of empirical fact or of a theoretical hypothesis. That is, we are not concerned with the truth or falsity of the assertion: Is language really like a chess game? On one interpretation, of course, all metaphors are trivially true. Everything is like everything else in some respect. On a second interpretation, a metaphor is always, and just as trivially, false, because there will always be differences. If there were not, they—the things compared—would be identical, and there would be no metaphor. Even where we are dealing with a scientific model which has a metaphorical element, it will be recognized that certain questions regarding resemblance between the model and reality are inappropriate. Thus, to take the example elaborated by Stephen Toulmin, in his book The Philosophy of Science, the theory that light travels in straight lines. It makes no sense to ask if, in traveling, it carries luggage. Similarly, it is pointless to ask what corresponds in language to the queening of a pawn in chess. A complete isomorphy is, then, not to be expected. In the present instance, DeSaussure himself points out one way in which language is not like a chess game. In language the players have no purpose, or, as he puts it, in a striking phrase, "Language does not premeditate anything." "La langue ne prémédite rien." We judge a metaphor, then, not in terms of truth and falsity, but in terms of fruitfulness, suggestiveness and similar concepts. With these points in mind, let us turn to the particular assertions about language made by DeSaussure which have already been introduced by means of the comparison with chess.

On one point there is no quarrel with DeSaussure. I do not believe that any linguist at this date would seriously dispute that a language is a coherent structure and that it can be fruitfully studied from this point of view, that is, as structure. That this is so is the measure of success of the structuralist revolution which DeSaussure pioneered and nothing can ever detract from the glory of this achievement. It was natural enough, and characteristic of institutions

of revolutionary change in theory, however, that in stressing the possibility of and the value of the study of synchronic structure, he should have asserted not merely its equality with, but its superiority over, the earlier historical approach.

Still, even a consideration of the notion of the chess position as exemplifying the unity and coherence of synchronic structure raises certain questions of a dynamic nature. What is it to understand a position in chess? Presumably, it is to understand the future consequences of the moves available at the present juncture. Our understanding is, as it were, by its very nature, future-oriented. And what of the past? Is it, indeed, as DeSaussure so cogently put it, a matter of indifference whether one has followed the game up to that time as merely a curious bystander who has happened by? In chess we might be watching the unfolding of a strategy which will help us both understand the possibilities of the present position and predict to some degree its future course. Are there things like this in language? I believe so. There are longer-term processes, the kind of thing called 'drift' by Sapir, such as the breakdown of the case and gender system of Anglo-Saxon and its replacement by an analytic non-gender type of grammar, a process which can only be comprehended through observations over a fairly extended period. In connection with this, there is one way not noticed by DeSaussure in which language is not like a chess game. In a chess game, we know the rules. Only on this assumption could the curious bystander be in as good a position as someone who viewed the entire game up to that point. But language is more like a game in which we are trying to deduce the rules by watching the games. Hence, the more of the game we see and the more different games we see, the better off we are. Indeed, language is like a chess game in that among the vast number of abstract possibilities permitted by the rules, certain possibilities have been customarily utilized which would correspond to certain openings and certain well-known middle game strategies. In DeSaussure's version of the comparison, so to speak, there is no room for such entities as 'The Sicilian Defense.'

But the central point in terms of which we will be in a position to evaluate the notion of a chess position as a state and indeed of all

of the other points of comparison mentioned earlier in DeSaussure's conception of change as a relation between states is that, as he puts it, "only states exist."

DeSaussure's view of change is, as we have seen, a succession of states. Move number 16 is succeeded by move number 17, and there is, as it were, nothing in-between. This is a kind of quantum view of time in which time is discrete, rather than continuous. Alternatively, we could visualize language change as continuous. Perhaps it is like the arrow in the famous paradox of Zeno, which is continuously moving so that when it travels from one place to another it must pass through some intermediate place, and so on, ad infinitum. To what shall we liken language—to a chess game, or to Zeno's arrow? To neither. Rather, language is like a vast, lumbering elephant, a non-homogeneous mass in which some changes are propagating themselves, but have thus far reached only one part of the elephant's anatomy: in which some parts lag, while others are moving forward. What is this non-homogenous mass? It is the community of speakers, and the significance of viewing change in this fashion is what has led to the recent rise of sociolinguistics, particularly in its dynamic aspect.

Consider first the implications of this view for the langue/speech dichotomy. DeSaussure maintained this as a kind of absolute distinction. Still, change had to be accounted for. Its source, as DeSaussure points out, is speech (parole). The process by which an individual fact of speech becomes a social fact of language is described very cursorily (p. 98): "In the history of any innovation, there are always two distinct moments: (1) when it sprung up in individual usage; and (2) when it became a fact of language, outwardly identical, but adopted by the community." But linguistic innovations do not always spread to the entire community, for, from the viewpoint of communication, a speech community is not a homogeneous mass. Some innovations do not jump geographical, class or occupational barriers. As such partial innovations accumulate, dialect differences become more pronounced and eventually the original speech community may divide into separate communities, speaking separate but closely related languages. Indeed, it is

notoriously difficult to distinguish between dialect and language on either a purely linguistic or even a sociolinguistic basis.

There can be, as it were, no "magic moment" at which the individual linguistic fact becomes a social linguistic fact. For contemporaneous changes we do not know if they will ever penetrate the whole linguistic community. Further, when an innovation displaces an older form, the two forms subsist alongside each other for a shorter or longer period of time as variants within the community and in the speech of some individuals.

The foregoing schematic description of the process of linguistic change in a speech community, with its systematic and socially based barriers to the spread of linguistic innovations and the co-existence of older and newer speech variants, might be called traditional. It rests on evidence already available in the nineteenth century from dialect geography and comparative linguistics. It already creates the presumption that contrary to DeSaussure's remark that (p. 19) "Taken as a whole, speech cannot be studied, for it is not homogeneous," the realm of parole is not so lawless and random that it cannot constitute an object of scientific investigation.

Recent work, such as the pioneering studies of contemporary linguistic change in the United States by William Labov shows just how systematic such apparently unstable and heterogeneous phenomena can be. Even the statistical frequencies of competing speech variants within groups specified by such variables as age, ethnic affiliation and socio-economic status show remarkably coherent gradients.

The facts regarding the extensive variability within the speech community as the language perpetually undergoes change, and the implications of these facts for the Saussurean concept of the synchronic state as the stable object of scientific study, did not go unnoticed even within the Geneva School itself. Albert Sechehaye, himself one of the two editors of the Cours, treated this question with considerable acumen in an article published in 1940 in Vox Romana 5 1-48, entitled Les trois linguistiques Saussuriennes.

On page 12, he says: "The very notion of a state of language becomes doubtful when confronted with the true complexity of the facts The state of a language at a given moment is an intermediate situation between the language of yesterday and that of tomorrow, it is a transient and indeed elusive reality."

We seem to have reached an impasse. According to DeSaussure, the essential realities are states. Between them there is literally nothing. But already for his distinguished pupil Sechehaye it is precisely these interstices which constitute the reality, while the notion of fixed and graspable states is an illusion. We have in modern garb the most ancient of philosophic issues. DeSaussure is a Parmenidean for whom the only reality consists of states, while for Sechehaye, like Heraclitus, the essential reality is change. But there must be at least a pis aller, for descriptive and historical linguistics both appear to be alive and well, though perhaps both are doing more poorly than we realize, because they do not have a clear and well-defined object of study.

What I would like to suggest is that DeSaussure was essentially right in distinguishing state from process and in conceiving of change as a transition from an earlier to a later state. If he is really right about this, then we need only worry about what a state is, and process will, so to speak, take care of itself. However, the notion of state needs to be reconsidered in its relation to chronological time and to its presumed simultaneous application to an entire language at some conceptually defined and definite "moment." What I am proposing is that the concept of state be considered in relation to that of a particular language type. Let us assume, for example, that language can be classified typologically as tonal or non-tonal. Then a language such as Chinese, which is tonal, has been in the state of being tonal over a very long period. If we had to specify Chinese for any given moment in the last few thousand years, say, February 10, 1327 at 5 P.M., one of its specifications would be that it is in the state of being tonal, but of course it would be in a great many other states at the same time. Insofar as it is still tonal in 1550, it is still in the same state in that respect. In other words, states have durations and need not be viewed as instantaneous phenomena. However, no

type is eternal. A tonal language, for example, can become non-tonal, as has happened with Swahili, a Bantu language which has 'lost tone.' In this respect, then, it has changed from one state, that of being tonal, to another, that of being non-tonal. In the transition period, again for this particular typological characteristic, there must have been variation in the speech community, the typically parole-like manifestations of ongoing change. During this time period, in respect to this characteristic, it was in transition, or we might say that its state in regard to tonality was unstable, whereas Chinese has been stable in this respect over a very long period. Every language, then, at some moment, is in a very large number of stable states for each of a very large number of characteristics such as tonality, each of these states being, as a rule, long-lasting.

The reason a language can be described as a whole at some particular time is that the vast majority of its characteristics inhere in stable states. The unstable ones are ongoing diachronic transitions which have to be studied by parole methods such as those mentioned above.

We now turn to the question of form and substance, and here also the factor of linguistic change is relevant. If history may ever be said to settle anything, it has evidently rejected the irrelevance of substance. The Danish glossematic school founded by Hjelmslev as a direct outgrowth of DeSaussure's influence has been the most conspicuous proponent of this view, but the dominant trends in modern linguistics have been strongly adverse. The chief reason for this is related to synchronic and structural, rather than diachronic considerations, and can be best illustrated from phonology. The phonemes of a language are not merely elements, such that each is different from every other. They constitute a more tightly organized system in which certain ones are more closely related to others because they have more features in common and these features have a physical phonetic basis. However, here also the consideration of linguistic change has its place. If the physical substance of sound is irrelevant we cannot understand why a particular sound changes to another which is phonetically similar and not to just any other sound, regardless of substance.

Finally, we may consider the general arguments advanced by DeSaussure for the superiority of the synchronic to the diachronic point of view. As we have seen, the heart of this argument is that to quote a passage cited earlier (p. 90): "Here it is evident that the synchronic view predominates, for it is the true and only reality to the community of speakers." It might seem that in evaluating this argument, we are encountering irreconcilable value orientations between which there is no empirical basis for choice. For some social scientists it is self-evident that our goal is the discovery of some kind of psychological reality while for others it seems an irrelevant, and even senseless, demand.

In approaching the question, it should be noted that DeSaussure has been implicitly setting up the following equations: Internal = synchronic = static; and external = diachronic = dynamic. But we have seen that change starts in individual speech habits, and so must have internal psychological correlates just as much as the stable aspects of the system. The ancient antinomy of being and becoming is just as surely a part of internal psychological reality as of external history. Of course, as DeSaussure clearly realized, the past historical events are not part of the present psychological reality, although, as has just been asserted, the present ones, that is, those in course, are.

DeSaussure's doctrine has a further corollary. Although DeSaussure did not use the currently fashionable terminology of scientific explanation, it is clear to him that if scientific laws are to be discovered, they will be synchronic and not diachronic (p. 93): "We can speak of law only when a set of facts obeys the same rule, and in spite of certain appearances, diachronic events are always accidental and particular."

This view, it might be added, is consonant with a considerable body of opinion which opposes social science to history and considers the former to be concerned with recurrent regularities or laws, and the latter with irreducibly unique and individual events. There would seem to be, however, no inherent necessity for this to be so. Invariant

relations cannot be discovered unless facts are related to or classified with similar facts. In addition to the presumably unique contextual relations of historic facts, it is possible to compare, classify and relate changes in historically independent but similar ways. This involves, for linguistics, a generalization of the inherited comparative method which has traditionally been concerned with the genetic explanation of specific linguistic facts in a single linguistic stock by means of their specific historical antecedents. If indeed there are lawful principles relating to synchronic states, there must also be diachronic principles. For on the level of universals, diachronic and synchronic must be related, since no diachronic change can result in a non-lawful synchronic state and every synchronic state results from diachronic processes.

The earlier discussion, in accordance with which a language is defined as being in a particular state when it possesses a particular typological property, becomes relevant at this point. For by applying DeSaussure's conception of the relation between state and process, a change from one type to another is a process. For example, the change of a language to a non-tonal type after it has been tonal is a process. Viewed in this light, process becomes generalizable, since many languages separated in time and space have undergone this change. The generalization of the comparative-historical method referred to above is then the study of change of type in which we seek to discover the universal constraints involved in such changes. That is, we attempt, for example, to construct a general theory of how non-tonal languages acquire tone.

Contemporary generative grammar could seem, in one of its aspects, to be moving towards such problems, since grammars, by the use of ordered rules, involve an internal dynamic which to some degree incorporates historical changes, while at the same time this school is emphasizing the study of language universals.

If the problem of change of type should become a central one for linguistics, then traditional comparative linguistics becomes integrated in general linguistic theory and it once more assumes an essential role, for it furnishes the individual cases for comparison.⁷

If we do this, however, we will not be merely repeating what has been done earlier, and it behooves us not to throw out the achievements of the intervening structuralist period. For one of the great achievements of structuralism has been to understand change as occurring in a system and not in isolation.

In this connection it is of interest to note that DeSaussure himself voiced similar opinions *mutatis mutandis* when he reacted against the historical approach, and in doing so felt a sympathetic bond to the period of general grammar which preceded 19th century historical linguistics (pp. 82-83): "Linguistics, having accorded too large a place to history, will turn back to the static viewpoint of traditional grammar, but in a new spirit and with other procedures, and the historical method will have contributed to this rejuvenation." Just so, if there is to be a revival of diachronic interest, but in a new form and on the generalized plane of process, the structuralism which it is the imperishable achievement of DeSaussure to have first enunciated in comprehensive form will similarly play its part in the rejuvenation of an older approach.

NOTES

1. Lecture given in San Diego, California, November 19, 1970, as Distinguished Lecturer of the American Anthropological Association. The text is, except for a few minor changes, mainly stylistic, identical with that of the oral presentation. However, a few footnotes have been added in the interest of fuller documentation and of discussion of a few points where the brevity of the text might lead to misunderstandings.

2. The first half of each of these courses was devoted to comparative Indo-European and the last half to general linguistics.

3. Among the items concerning DeSaussure which were not cited in the text and from which I have profited are the following: (1) Doroszewski, W. 1933. Quelques remarques sur les rapports de la sociologie et de la linguistique: Durkheim et Ferdinand de Saussure. Journal de psychologie 30.82-91. (2) Wartburg, W.

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4. All citations of DeSaussure in the text are from the English translation of the Cours by Wade Baskin (New York: Philosophical Library, 1959).

5. I have shown here what appears to me to be the essential basis of DeSaussure's distinction between langue and parole. However, as appears from the text which immediately follows, DeSaussure also distinguished langue and parole as the social versus the individual, and, it may be added, still elsewhere as the auditory versus the articulatory. Yet all of these are logically distinct. For example, as has been noted in the literature several times, the individual has both an overall system which corresponds to langue and actualization of this system in concrete speech behavior, corresponding to parole.

6. However, some scholars consider that two of these consonants appear in Hittite, one unvoiced indicated intervocalically by occasional geminate writing and the other voiced.

7. The following passage requires something like willing suspension of belief. If there is anything of which I am certain it is that a science never moves in the direction one would predict, which is usually the one that one hopes for. I have sketched both a theoretic basis and concrete applications of the processual approach referred to here in several recent publications, e.g. Synchronic and diachronic universals in phonology, Language 42.508-17 (1966).

Bibliography of Joseph H. Greenberg's Works

Compiled by Anwar S. Dil and Emily Hallin

List of Abbreviations:

<u>AA</u>	<u>American Anthropologist</u>
<u>Afr Stud B</u>	<u>African Studies Bulletin</u> , African Studies Association / Hoover Institution
<u>J Afr L</u>	<u>Journal of African Languages</u>
<u>JAF</u>	<u>Journal of American Folklore</u>
<u>JAOS</u>	<u>Journal of the American Oriental Society</u>
<u>Lg</u>	<u>Language</u>
<u>MSLL</u>	<u>Georgetown University Monograph Series on Languages and Linguistics</u>
<u>Southw J Anthropol</u>	<u>Southwestern Journal of Anthropology</u>
<u>WPLU</u>	<u>Working Papers in Language Universals</u> , Stanford University

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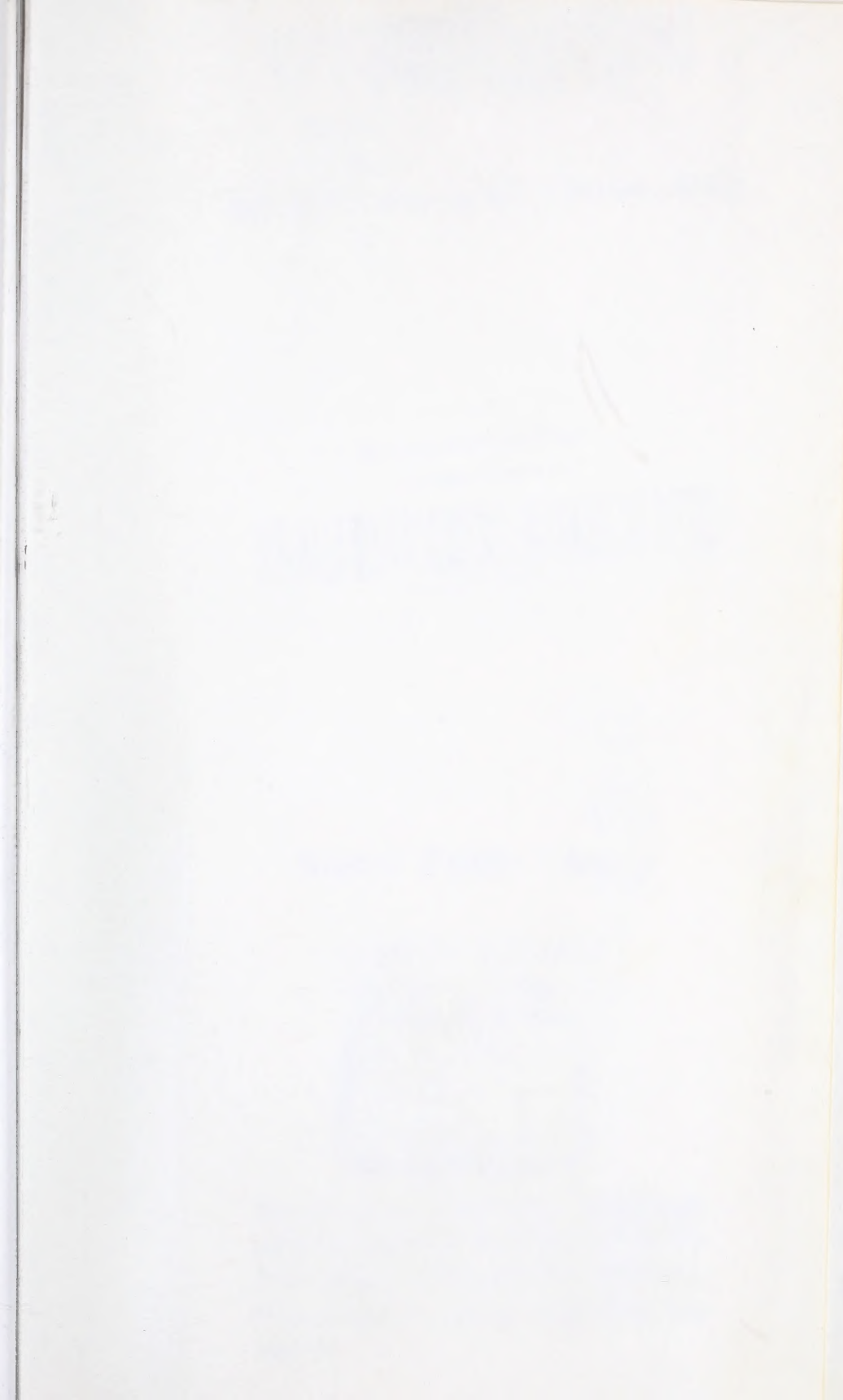
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